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The AUTOMOBILE

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VOL. XXXIV NEW YORK—THURSDAY, JANUARY 6, 1916—CHICAGO No. 1

The AUTOMOBILE

Switching Off the Spotlight

For the First Time in Sixteen Years the New York Show Discloses Attention Centered Upon Whole Car Rather Than Upon a Part

By A. Ludlow Clayden

NEW YORK CITY, Jan. 1.—A new régime in automobile shows began last night when the sixteenth annual automobile show was opened in Grand Central Palace. When the doors opened there was ushered in a régime wherein the spotlight, which has dominated all past shows, was switched off.

In the great public spectacles that the development of the automobile has staged since the birth of the twentieth century there have been many acts and many scenes. Through all of these the spotlight has been busy flicking from one mechanical feature to another, from four-cylinder motors to sixes, from bevel drive to eight-cylinder motors, from motors to starters, from starters back again to motors. Each successive annual show had its star performer of the mechanical company, fit subjects for the spotlight, but to-day we have reached a point where the full cast, linked arm in arm, bursts into a general chorus, where each member is singing the same song. The scenic and the physiological effects depend no more upon the principals than upon the supers.

It is no final curtain, the last stage of development, for the last act lies far away, but we have reached a period in the great play that marks an epoch in the making of the story. That this was so needed not the declamation of the show to establish it as fact, but the show itself removes all doubt, all argument. It is the first automobile show in history displaying automobiles acclaimed for what they are and what they will do, instead of for how they are made and for what pieces are used in their construction. In a word, engineering development seems to have reached a stage where it is taken for granted. The buyer need no longer exercise judgment so much as taste.

Engineering Quality High

That the average engineering quality of the chassis exhibited would surpass all previous shows was a foregone conclusion, yet it is surprising how great has been the advance from the high standard set a year ago. In 1915 the critical visitor, admiring the general progress, was ever and anon, brought to a stand before some relic of the past; some clumsy, ill-conceived, ill-executed car. To-day there is scarcely one such to be found on the four floors of the Grand Central Palace show with its 326 cars and chassis on exhibition.

Last year the leaders of development set the standard high, but the followers have made the leap required and the assembled ranks present the most solid front yet seen, not only in America, but in the whole wide world.

It was not in any one particular that the standard was raised. To-day we do not see the limelight on motors, on transmissions or on springs. The perfect automobile is a collection of perfect parts, and all parts are of equally great importance in the ultimate. For the first time, so it seems, this is realized, and it is especially to be noticed that the show visitors exhibit no curiosity about any particular feature. True, there are some new cars that all are anxious to see, there are some stands which are continuously thronged, but the people have gone there to see the *car*—not to see a portion of it.

General view of the central court on the main floor of the sixteenth annual New York automobile show being held in Grand Central Palace. The entire scheme of decoration consists of dark-colored draperies between the dual Corinthian columns which in themselves are a feature of the building. Overhead is a generous hanging of flowers and foliage on the cornices and chandeliers. The exhibits illustrated above bring out the variety of body styles which is a feature of the exhibition. The columns on the second floor are treated in Renaissance figures and pergola effects. The third floor where the accessory exhibits are for the most part situated is designed to give a Japanese garden impression, an idea of this scheme of decoration being given in one of the other illustrations showing this great accessory division with its aisles bordered by exhibits of all sorts

As a sight to attract the eye the show is a good one, but the feeling cannot be avoided that there is a lamentable lack of sensibly colored cars. It cannot be good merchandising to fill a stand with somber black, it does not catch the eye, but is it not equally poor business to use as an attraction some glaring monstrosity of color? The all-black stand the visitor may pass by, at the one with the brilliant car he halts, but he is seldom so impressed from a buying viewpoint as by a stand with two or three different colored cars which are of hues suitable for use. There are more chassis than ever before, mostly finished in a quiet paint which shows them off far better than any other method—actually of the 326 cars fifty-six are stripped chassis— and there is hardly a maker of importance who does not show all detail of his car.

Accessory Field Consolidating

In accessories it is to be observed that those shown are mostly of a more solid character and mostly exhibited by reputable firms. There is a notable absence of cheap devices of the tin can order, which have been prevalent at many former exhibitions—especially, perhaps, is evidence of this settling down process to be noticed in the Ford accessories, most of them being of the really useful sort.

One misses, however, the majority of the leading component makers. Axles and transmissions, clutches and starters are used extensively as selling arguments for the assembled car, and the show provides the opportunity for the manufacturers of these essential parts to show why their names are renowned. The maker of parts derives his success from the public, indirectly if you like, but it is from the public that it comes, and the public is interested in what the parts makers are doing. Ignition is well represented, carburetion well displayed; why not all the other sections of automobile makeup?

Bodies for Every Taste

Apart from generalities, undoubtedly the great feature of the show is the wide choice of bodies. Hardly a manufacturer but has a half dozen styles to choose from; the quality of his chassis established, he has turned to the study of the public's multifarious tastes. Last year one noticed the streamline touring body, the smooth outline, the spacious interior; this year the finest group of touring bodies ever gathered together in America can be seen, yet they do not impress the mind so much as the many other varieties which have grasped places of prominence.

Leaders among the newcomers are, of course, the small four-seated car, the large three-seated body and the inexpensive closed machine. All are easy targets for criticism since all have their faults as well as their virtues. Many a man who sighs for the cosiness of a clover leaf, four-passenger will find it hard to select one wherein cosiness is not obtained at the expense of knee cramp, or where leg room has been fashioned with detriment to the appearance or to some other feature. A few there are that seem well nigh perfect, but as yet it is but a few.

Then with the cheap closed cars, and the convertible types especially, the excellent examples stand out clearly from the rest. These things are natural, they are not noticed at first glance, they appear only on close examination, the faults will vanish in another year; on the whole, so far as the clover-leaf bodies are concerned, it is remarkable that so many good ones have grown up in a single year.

In body quality the greatest variations are to be found among the convertibles, the touring cars that will inclose completely. Of these a few can, when in the closed state, hardly be distinguished from a real closed car; some would be quite indistinguishable when on the street, but others look all of the makeshift that they are, clumsy, ill-designed and badly made. The good examples show what *can* be done. The rapid adaptability of the American manufacturer will soon raise the average to the height of the present peak, and the future of this body style depends entirely upon whether the car owner will treat the convertible body as he does his home, regarding the task of attaching the top much as he looks upon that of getting the furnace into service for the winter.

And here a mild grumble on the fully closed car that is not meant to open, this being that not infrequently the comfort of the interior depends upon the scope remaining *after* the outer lines and form have been fixed. A prettily curving roof may easily so meet the back panel that a passenger can only wear a hat by adopting a crouching attitude. This is very far from being usual, but it is noticeable in a sufficient number of instances to make this comment really deserved.

Folding Seats in Transition

Not so long ago the folding seat of a seven-passenger touring car was always rather in the way, rather ugly and rather liable to rattle. To-day we see many bodies in which the presence of the seat when folded is difficult of detection. Iron bars and brackets lying about the floor or walls of a tonneau are out of place; they do not harmonize with soft upholstery and velvety carpets. A piano would give as sweet music without its polished case, just a bare skeleton of frame and wires, but it would be out of place in a living room. It is now about twelve months since the automobile body designers woke up to this, and how busy they have been is easy to see. As usual some have been successful to a much greater degree than others, but on the whole the congratulations of the public are due unstintedly.

More Rigid Chassis

Hand-in-hand with body development has gone relief of body strains, this being sought by so increasing the strength of the chassis frame that it will protect from injury the more delicate structure that it supports. Deeper and wider sections are the rule, and more frames have been widened so as to bring the side rails almost as far apart as the sides of the body at their widest. This is supposed to prevent racking strains, by broadening the base of body platform, and putting the rear springs beneath the side rail instead of outside it removes some twisting stress. The wide frame is not uni-

versal by any means, but it is being largely used in the attempt to overcome the tendency to the development of body squeaks after a long period of use.

Better Springing

Spring mounting has undergone a great change, having, it is obvious, become a study of mechanics instead of an accident of assembly. It is not so much the type of spring as the details of its shape and the brackets which attach it. Engineers have closely studied the forces involved and schemed to meet them to best advantage. The subject is a wide one, far too wide to discuss within the limits of a show review, but it should be noticed by the mechanically intent. In a nutshell, the 1916 car is better balanced.

Not the least remarkable thing is the decreased interest in motors. With the finest selection ever got together before their eyes, the show visitors evince a marked interest in neatness of design, in convenience of arrangement, but far less than last year in the number of cylinders or the main mechanical features. A strikingly designed four attracts as much attention as a twelve, a well constructed six draws a bigger crowd than a poor eight. The thing is impressive only to one who saw the shows of years ago, especially, perhaps, that of last year. Then to have an eight was to block the surrounding aisles all day, but the twelves in the present show, while drawing many, have nothing like the same magnetism. They are, of course, not so new as was the eight a year ago, but the impression persists that there is more than this in it; that no mystery now lurks in multiplicity of cylinders. The V motor of however many cranks and pistons is an accepted thing whose virtues are known and realized just as widely as those of the six or four.

In the making of the automobile, in the changing of it from a mechanical toy to a necessity of civilization, we first sought effectiveness, and it was obtained. Next reliability was the goal, only to be won after years of hard struggle. Then came docility—quietness, flexibility, ease of handling, and to this many years were given. Then came the more petty things which may, when lumped together, come under the head of convenience. Ease of starting, protection against weather, luxury of appointment in all their ramifications come under this classification.

For a time this last became a madness, robbing the car of engineering qualities, adding to it new possibilities for trouble, but now; now we see a proper balance struck. Whatever price we may choose to pay for an automobile we can write the check with confidence that we are buying our full money's worth in automobile service to our desires and expectations.

The spotlight is out for this scene. The footlights are burning at full power, the whole stage, the chorus and the leaders make one great picture complete in itself and dependent upon no single, glittering figure for its effect.

The Year to Come

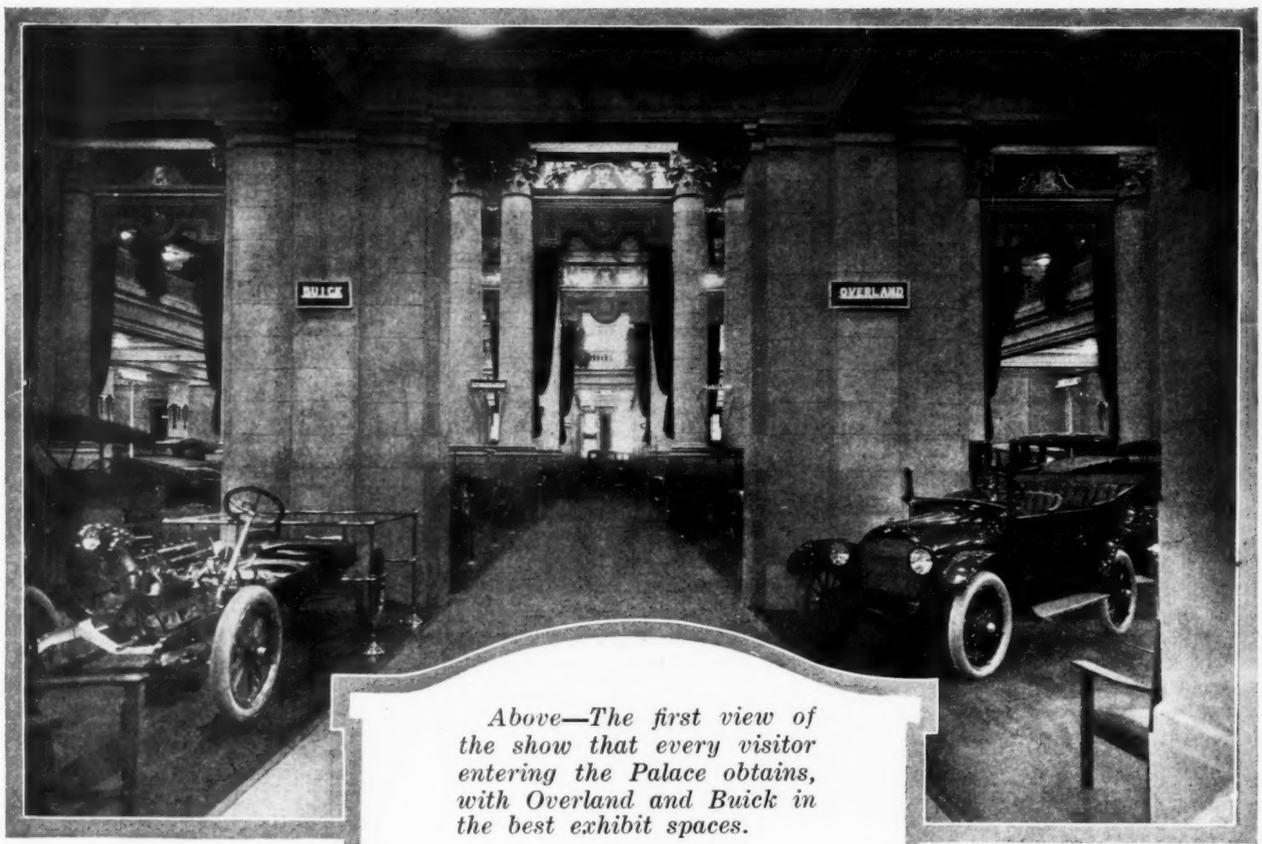
What is to be read in the show of to-day as an augury of the future? The question is none too easy to answer; it may be that this removal from special prominence of any particular feature of a chassis is but temporary, that next year we shall find the spotlight very much in evidence. But it seems more probable that this will not be the case. To review the past, the earlier things of outstanding remark, such as six-cylinder motors and, afterward, starters, were things that really made for better motoring. Because of the six-cylinder motor we were able to obtain certain refinements at reasonably low cost, because of the starter we were able to increase the comfort and convenience of motoring to a substantial degree.

But the later parts of prominence have been of much smaller actual importance. The eight and twelve-cylinder engines have not made a tithe of the difference that was caused by the starter, and it is difficult to foresee anything which could again break right away from the standard practice of the times. Perhaps a two-stroke motor boom year may be in store for us. Perhaps an electric transmission year is scheduled by the fates, possibly we may even live to see a year in which two wheeled cars will have a vogue, or cars with front wheel drive. Perhaps the gearbox will be abolished for something better, but the greater probability is that development henceforward will be gradual—that we have done with the spotlight.

New York Show Statistics

	Grand Cent. Pal. 1916	Grand Cent. Pal. 1915	Grand Cent. Pal. 1914	Garden and Pal. 1913
Total exhibitors	391	317	349	424
Car exhibitors	84	80	78	89
Accessory exhibitors	306	223	259	320
Motorcycle exhibitors	1	..	12	15
GASOLINE CARS (including stripped chassis)				
Two-cylinder	0	0	2	0
Four-cylinder	108	96	132	169
Four-cyl. (piston valve)	0	0	1	0
Four-cyl. (sleeve valve)	8	10	8	6
Six-cylinder	136	105	98	86
Six-cyl. (sleeve valve)	0	1	2	4
Six-cyl. (crescent valve)	0	2	0	0
Six-cyl. (rotary valve)	0	0	1	1
Eight-cylinder	39	7	0	0
Eight-cyl. (sleeve valve)	3	0	0	0
Twelve-cylinder	13	0	6	0
Total	307	221	244	266
TOTAL GASOLINE PASSENGER CARS				
Touring cars	117	124	143	162
Roadsters	77	48	50	49
Demountable top	15	2	0	0
Limousines	11	18	15	23
Berlines	1	2	6	8
Coupés	6	7	17	*19
Sedans	11	6	14	0
Cabriolet	5	4	5	0
Town cars	5	0	0	0
Landaulet	3	1	1	0
Phaeton	0	1	2	1
Brougham	0	4	0	0
Raceabout	**	3	2	2
Total	251	221	264	266
Air-cooled cars	3	3	6	5
Water-cooled cars	248	218	258	261
Total	251	221	264	266
STRIPPED CHASSIS—GASOLINE CARS				
Four-cylinder	19	20	21	27
Four-cyl. (sleeve valve)	3	4	0	0
Six-cylinder	19	26	15	21
Eight-cylinder	8	1	0	0
Eight-cyl. (sleeve valve)	1	0	0	0
Twelve-cylinder	4	0	0	0
Total	54	51	36	48
ELECTRIC CARS AND CHASSIS				
Stripped chassis	2	†	†	†
Coupé	11	1	2	7
Brougham	4	9	13	0
Roadster	1	3	1	3
Cabriolet	1	1	0	0
Town car	0	0	1	0
Limousines	0	1	0	0
Total	19	15	17	10
Grand total cars and chassis on display	326	286	318	325

*Includes cabriolet. **Raceabouts included under roadsters. †Not recorded.



Above—The first view of the show that every visitor entering the Palace obtains, with Overland and Buick in the best exhibit spaces.

Below—General view of accessory division on fourth floor of Grand Central Palace show. The pillars are inclosed with bamboo matting.

Many New Cars—Few Surprises

While Show Affords First Opportunity for Examining Many New Cars, No Novelty of a Startling Nature Was Reserved Till the Show Was Opened

IF the New York show, 1916, contains less of novelty in chassis design than did its immediate predecessor, there are none the less plenty of interesting new cars to be seen there for the first time. Most of the twelves are new models entirely. There is the Marmon six with its light weight construction and aluminum motor. There is the Moline with the same type of frame as the Marmon and also a motor almost all aluminum. The Hudson Super-Six is the newest of all, perhaps, but the Peerless eight, the Scripps-Booth eight and the Cunningham eight are also cars which have been announced quite recently.

Similarly the Paige company has a new six and there is a new model Case and in fours we have the Briscoe, the Sterling and the S. J. R., the former with a new model, the last two named with entirely new cars. Other companies new to the industry exhibit the Lescina cars and the Sun six, while the one foreign car in the show, the Irish Fergus chassis is especially interesting from the engineering viewpoint. Of this list the majority have been described in THE AUTOMOBILE within the past few months, and redescribed briefly in last week's show number. It remains to add the details of the few which are left outstanding.

Hudson Super-Six Has Unique Motor

THERE has been much speculation as to the details of the new Hudson six, which makes its appearance at the show. Interest especially centers in the motor, which is the first to be built by the Hudson company itself under its own roof, and it is evidently destined to mark a new epoch in Hudson development, for with the same bore and stroke as that of the previous model it develops 80 per cent more power. That is, whereas the Six-40 was considered a good example of six-cylinder practice, delivering a maximum of 42 hp., the new engine with the same displacement of 288.6 cu. in. and the same bore and stroke of 3½ by 5 in., develops a maximum of 76 hp.

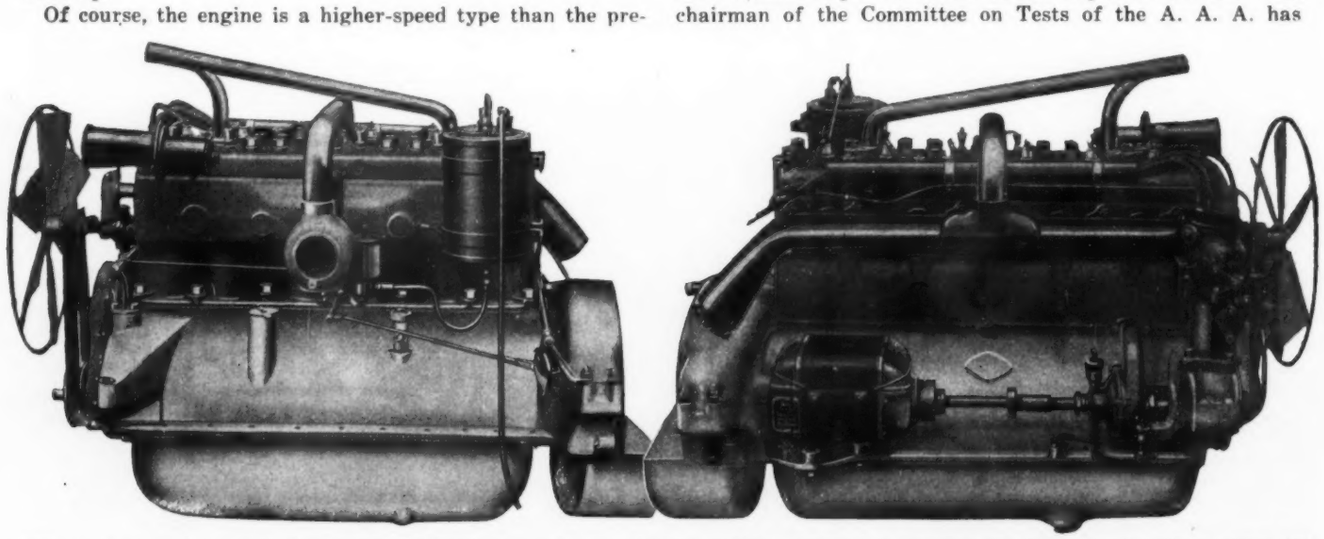
Of course, the engine is a higher-speed type than the previous design, running upwards of 2600 and 3000 r.p.m., this having to do with the added power. The main point of attack seems to have been the crankshaft, and recognizing that vibration has been a limiting factor in high-speed engines, the Hudson engineers set about to get rid of the trouble by revising the shaft construction, the result being a patented system of eliminating vibration so as to get an engine of high mechanical efficiency.

General practice is adhered to throughout the other details of the engine, although, to take care of the higher speed, the valve openings have been increased considerably, and the four crankshaft bearings have been enlarged as compared with those of the Six-40.

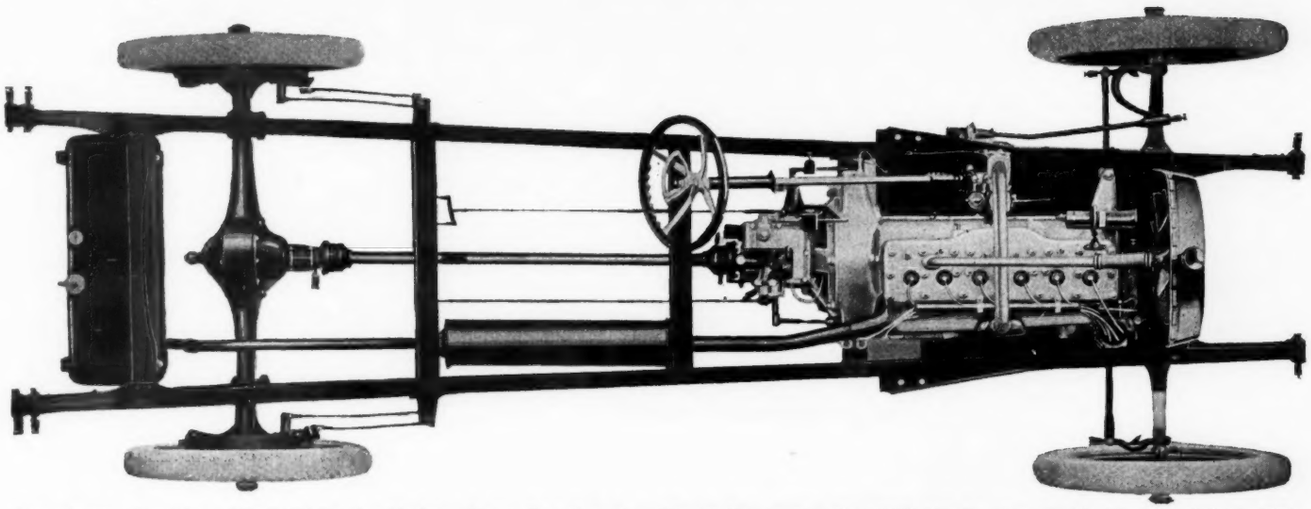
Tests Show Unique Acceleration

That the new designing ideas of the Hudson company have proven fruitful is evidenced from the fact that the new car, under supervision of the A. A. A. has broken all stock car records up to 100 miles, its official weight without passengers, but with tanks full, being 3164 lb. For the hour it covered 75.689 miles with two passengers, and with five passengers and top and windshield up the distance covered was 70.742 miles. The fastest laps of the 2-mile Sheepshead Bay track, where the tests were made, were during the hour trial above referred to, and these laps were both made in 1 min. 33.8 sec., which figures to an average speed of 76.75 m.p.h. These tests therefore give to the new Hudson all the stock car records from 5 to 100 miles for machines with motors of from 231 to 300 cu in., displacement, and they further present it with the hour record regardless of class.

The official A. A. A. report also shows the accelerative possibilities of the car to be remarkably good. From a standing start, the touring model carrying three passengers attained a speed of 60 m.p.h. in 23 sec., and reached a 50 m.p.h. gait in 16.2 sec. Starting from 5 m.p.h. in high gear, it reached 30 m.p.h. in 10 sec. and 50 m.p.h. in 19.4 sec. The chairman of the Committee on Tests of the A. A. A. has



The Hudson motor which develops exceptional power for its size has nothing external to disclose the fact. In the above views the excellent valve accessibility and the peculiar carbureter are well shown



Cleanliness of outline characterizes the Hudson Super-Six chassis. Aft of the motor the 1916 car is very much like the 1915 model, except that the rear end of the frame is shaped somewhat differently

certified that the car used was a stock model in every detail, and it is very evident from the figures above given that the engine is destined to upset many ideas that the maximum horsepower per cubic inch displacement was attained with sixes heretofore produced.

Car Is But Little More Costly

Although the new car is vastly superior to anything before built by Hudson, it sells at about the same price as before in the open models, the figure being $1,375, which is $25 more. There are four attractive closed-body types at figures ranging from $1,675 to $2,500. Body designing has not been lost sight of in the attention that has been paid to the engine, and the body lines are entirely new, departing from the yacht-line idea of the former Six-40. The radiator is higher, and the body lower with more room, especially in the front compartment. As compared with the Six-40, the wheelbase is 2½ in. greater, being 125½ in. The passengers sit lower in the car, and there is the popular double cowl effect. That is, there is a sort of modified dash, finished the same as the body sides, in place of the seat backs formerly constituting the division between the two compartments, this construction having numerous advantages.

Carbureter Is Hudson Design

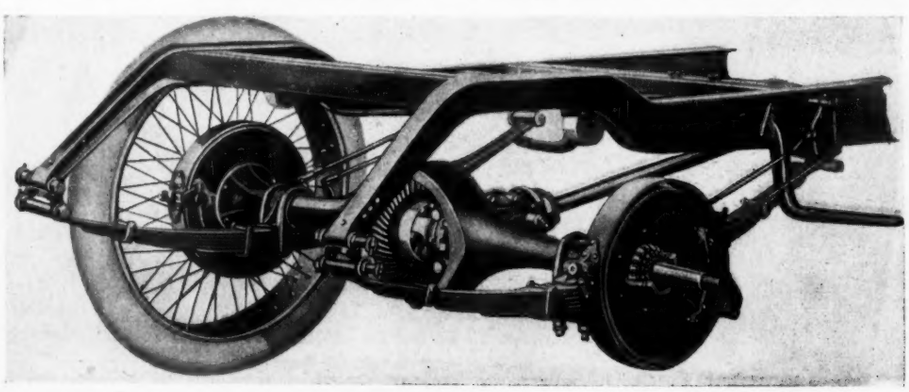
Among the other differences in the car as compared with the previous model are, in addition to the entirely new design of motor, a new carbureter designed by Hudson, which is a type operating pneumatically. The Delco starting and lighting system is new, the gasoline tank is removed from the cowl and located at the rear in connection with Stewart vacuum feed and there is a new rear spring suspension of semi-elliptic type instead of three-quarter elliptic, with a corresponding change in the rear of the frame. Such details as the three-speed gearset in unit with the engine, the multiple-disk clutch and the Hotchkiss type of drive remain practically the same as in the previous model.

Accessibility Is Noteworthy

Special attention has been paid to the accessibility of the engine, the arrangement of the units being with this in view. The engine is a conventional L-head poppet valve type in outward appearance, and it has a feature new to Hudson construction in the removable cylinder head, although the usual practice (where the head is detachable) of casting the upper half of the crankcase with the cylinders is not employed. Hudson gives two reasons for the detachable head: it facilitates cylinder casting and gives better cooling which is required by the large valves. It is pointed out that it would not be practicable to use port plugs of a conventional type without sacrificing much valuable cooling efficiency through the increased area of the walls and reduction of the water spaces.

Oiling System New

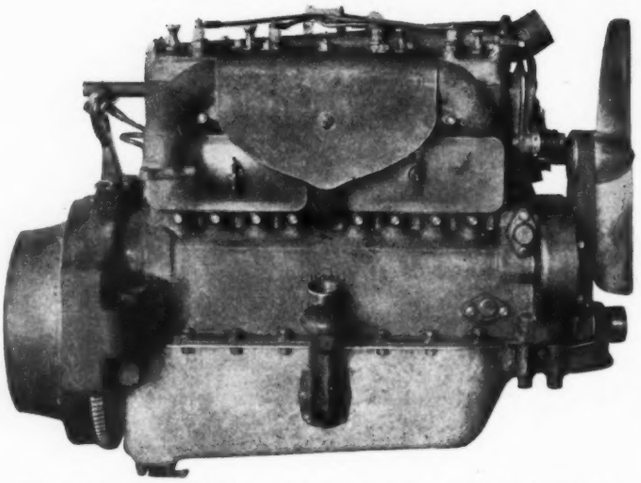
Naturally, an entirely new oiling system had to be developed for this engine, due to its greater speed and power. This is termed a circulating, constant-level splash arrangement and the capacity is very large, totalling over 3 gal. The reservoir is at the bottom of the engine, the pressed steel pan being quite large, and exposed so as to afford good cooling to the lubricant. The oil pump, mounted at the front of the engine, draws the oil from the reservoir through a screen and delivers it to the front compartment containing the timing gears, and from here it flows into the first oil trough under the first cylinder. The large splasher on the end of the connecting-rod practically empties this trough at every revolution, throwing the oil into suitable channels on the side of the reservoir and crankcase. The upper channels feed the main bearings continuously, and the lower conveys it to No. 2 trough, from which it goes on back suc-



In order to accommodate the long, semi-elliptical springs the ends of the Hudson frame are dropped much lower than usual. This construction interferes very little with the body fitting

cessively through the other troughs to the last cylinder, and thence to the reservoir again.

As the connecting-rod dippers would splash more oil at high speeds than at low, it was necessary to control the stroke of the pump so that the flow might be increased proportionately to cope with the more rapid circulation. To take care of this, the carbureter throttle is interconnected with the pump in such a way as to regulate the pump plunger stroke. The action is simply attained by means of an eccentric and a very large pump plunger. At low speeds the eccentric holds the plunger away from the operating cam, but it allows the plunger to come closer to the cam as the speed increases. Thus the pump has a short stroke when the engine is operating slowly, but when the throttle is opened the stroke is lengthened accordingly.



The motor of the most recent Case chassis has the carbureter on the off side, and an extra large muff or hot air collector embraces the exhaust manifold

Water Pump Bolts to Cylinders

In the cooling system, aside from the refinements such as the increasing of the fan diameter and the making of the radiator core and shell separate, there is one especially notable feature. This is the construction of the water pump so as to eliminate any pipes or hose connections between the pump and the cylinder casting. The pump bolts directly to the face of the cylinders and the water passage leading to the jackets is cast integral with the cylinder block. The cylinder outlet connection, with two branches leading from the head, reverts to the brass pipe form so as to insure a certain amount of flexibility and unrestricted water passage, along with quicker repair possibilities than would be obtainable were the water outlet cast as a part of the head.

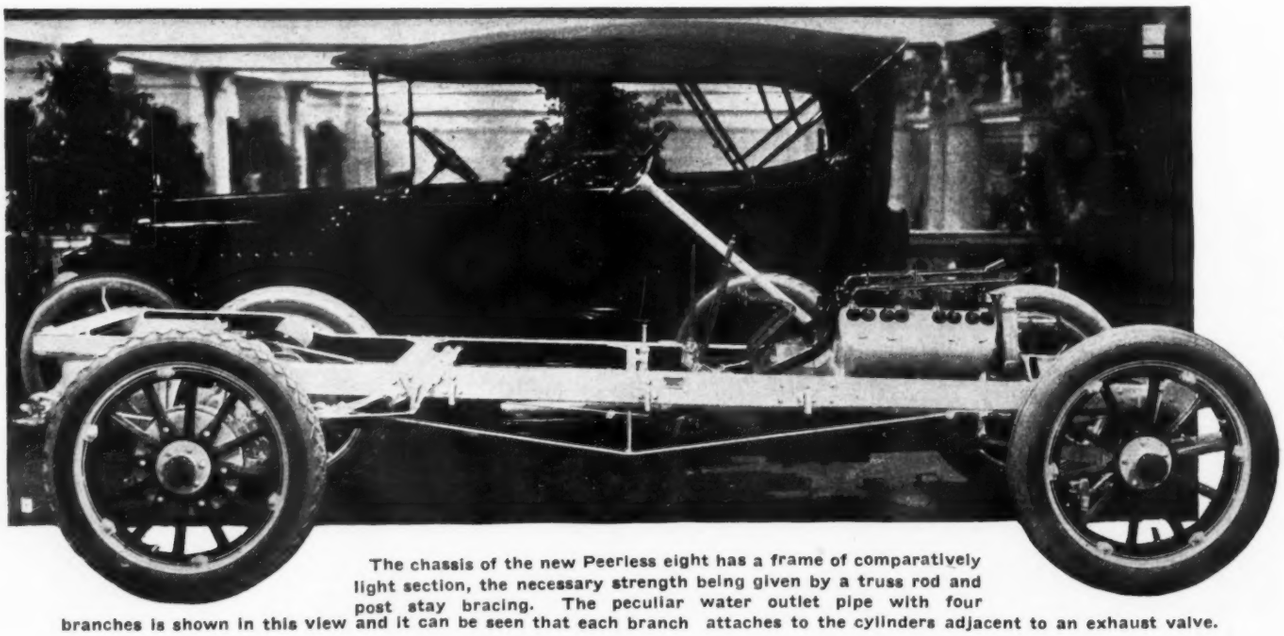
Delco ignition, as well as starting and lighting, is still used, but distributer is placed vertically on the right forward side of the engine and is entirely independent of the motor-generator. There is an automatic governor controlling the operation of the ignition advance, as on Hudson cars for the past 2 years, and by it the manual control is given a spark advance range from full retard to a position which would correspond with firing on dead center under normal road conditions. But from this point on to full advance the spark control is automatic, taking it out of the hands of the driver. The motor-generator occupies the right rear side and is driven from the pump shaft. To facilitate the lining up of the generator, it is piloted in the crankcase supporting arm.

Reverting to the chassis, the characteristic Hudson simplicity is found, and with practically no design alterations in the gearset, the tubular driveshaft or the rear axle with its spiral-bevel gears, the new rear suspension claims special attention. The springs, semi-elliptic in form, are in direct line with the side members and taper toward the front, affording a direct support for the body and frame. It is explained that the half-elliptics are employed because they permit of greater length and that means practically a flat spring which affords great flexibility with minimum weight.

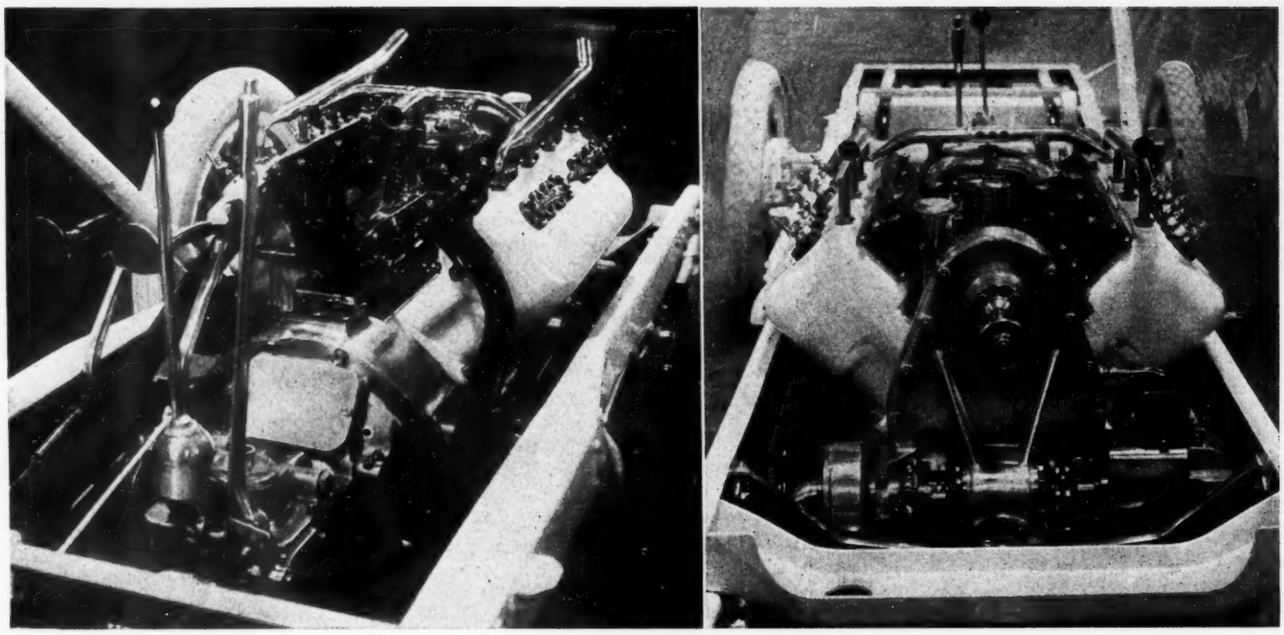
Springs of such length could not be three-quarter elliptic as they would have excessive side sway.

An outward noticeable point is the rearward inclination of the windshield at an angle of about 30 deg. This gives better appearance, reduces the length of the top, and kills reflections. It is also claimed that the vertical shield centers the draft and the dust on the back of the driver's head, whereas the slanting shield seems to carry it over the car, and offers less resistance.

A production of 30,000 of the Super-Sixes is planned for the year, and deliveries have already begun. The name



The chassis of the new Peerless eight has a frame of comparatively light section, the necessary strength being given by a truss rod and post stay bracing. The peculiar water outlet pipe with four branches is shown in this view and it can be seen that each branch attaches to the cylinders adjacent to an exhaust valve.



A noteworthy feature of the Peerless eight motor is the good arrangement of the accessories. The generator and water pump occupy opposite ends of a cross shaft in front, the distributer is well placed at the rear end of the V and the tire pump is at the other end, where it does not interfere with the valves

Super-Six, by the way, has been registered in the patent office.

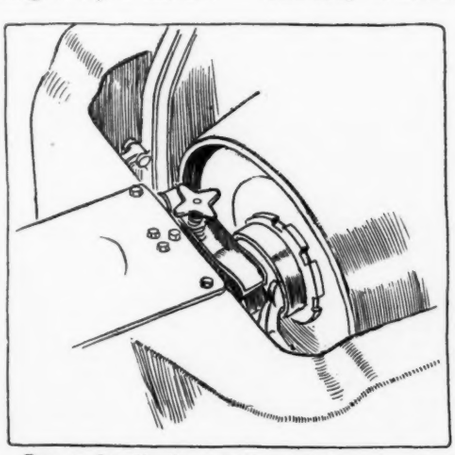
Peerless Is Thorough Design

IN the last issue of THE AUTOMOBILE some general particulars of the new model Peerless were given. It is a 3¼ by 5 in. eight with 125-in. wheelbase and the touring car sells for $1,890. Broadly, the design is not conspicuous for any departures from conventional good engineering, but the detail is worked out with much care and a great deal of skill. The engine is that type of eight in which the cylinders are staggered just enough to permit the use of side-by-side connecting-rod bearings, has a three-bearing crankshaft with exceptional bearing area, and L-head cylinders, its most impressive feature being the spaciousness of everything about it. There is ample room for everything, no accessories are crowded together, and every essential part is really accessible.

In the V is the carbureter, of course, and just in front of it the tire pump, as this is a small enough part not to interfere with the valve tappet accessibility. The pump has a very simple clutch, as its spindle carries a hexagon head and the back end of the fan spindle has a hexagon cup to match.

The oil filler cap stands on the right well to the front of the motor, and the water pump and generator are situated at right and left ends respectively of a cross shaft, which is driven from the crankshaft and lies low across the front end of the crankcase. The cranking motor is on the side of the crankcase, at the right, engaging the flywheel with a Bendix pinion.

The carburetion system is rather interesting, and the instrument itself is a duplex pattern of special design, and feeds into manifolds that are also duplex, there being four ports in each cylinder block which are divided across the center, the upper passage going to the exhaust valves and the lower to the intake. The manifold has thus two parts, the upper for exhaust and the lower for intake, and the gases are kept well warmed without the need for any waterjacket for the intake system. Battery ignition is employed, the distributer being at the rear end of the V on a vertical spindle driven off the camshaft.



Proper functioning of the clutch brake is of great importance for easy gear shifting. The new Case has the hand brake adjustment shown here

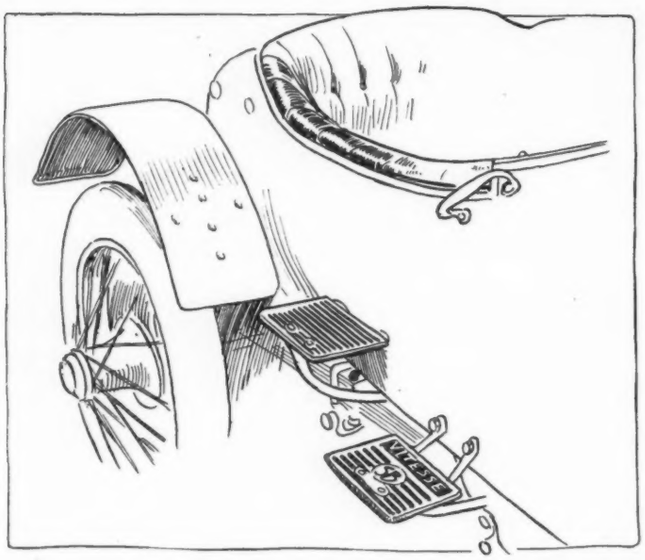
Lubrication is by pressure, all the bearings having a forced feed. Another feature of the power plant, which combines the three-speed gearset, is the remarkably light pedal pressure needed to release the dry disk clutch, since there is a multiplying system of levers between the pedal and the actual clutch striking fork.

Peculiarity is also noticed in the frame of the car, as this is a fairly light section, strengthened by a king post and truss rod on each side. This system of construction gives great strength with little weight, and it is surprising that it has not been used more extensively. The rear axle, with a pressed steel casing and spiral bevel gears, is quite conventional, as is the brakework, but the latter is noteworthy for the care with which the operating rods have been laid out so as to give ample rigidity. None of the pedal pressure is lost anywhere through whip or spring in the connections.

The body of the touring car emphasizes that the car is the product of a firm of repute and long standing. It is an entirely modern type of flush side design but free from any extremes of fashion. As would be expected of a Peerless car, the finish is everywhere thoroughly excellent.

Cunningham Has Fine Body

THE Cunningham eight, designed and built in the parent factory, is the product of a firm who prides itself upon the handsome bodies it can build, and the main feature of the exhibit is a small touring car of unique exterior. There is nothing freakish about the job which is easiest described as a combination of the streamline type with the boat body. All horizontal lines seen in side view are straight, and a light



The body of the Scripps-Booth "Vitesse" model is entered by aluminum steps attached to the side. The passenger has two of these and there is a single one on the driver's side

bead runs from end to end about 5 in. below the top of the side wall. From this point upwards the sides "tumble home" to use the marine expression, that is they are rounded over so that they curve smoothly into the cross section of the front and center cowls. The seats are not divided, but the backs are molded slightly to make a division between driver and passenger, and between the rear seat occupants. Finished in dark, dull gray and with wire wheels the car gives a good impression of power and solidity.

The Cunningham eight-cylinder motor is 4¼ by 5 in., it has detachable cylinder heads and is set rigidly in the frame, the aluminum crankcase having four stout supporting arms. The Brown-Lipe transmission, which is bolted to a bell housing on the motor carries the Westinghouse starting motor on its side and the tire pump is set high up on the fan bracket, so the V is fairly clear of parts and the valve mechanism reasonably accessible. There is a particularly wide center bearing, the cylinder castings being provided with a large waterway between the middle bores, and the oil is put in through fillers located on the heads of the cylinders midway of their length. Altogether the engine is extremely robust and in keeping with the rugged chassis.

The rear axle is a heavy pattern Timken, and is provided with a massive pressed steel torque arm which is anchored to the frame by a short leaf spring, and the frame itself has an exceptional section. Three-quarter rear springs are used. With touring body the price of this new eight is $3,750.

Scripps-Booth Features Bodies

OF the Scripps-Booth eight particulars were given a week ago and the exhibit is designed to feature the complete cars rather than the chassis. The eight is but little larger than the four having the compact Brush-Sterling motor which is the same type as the Ferro and was illustrated by sectional drawings in THE AUTOMOBILE review of 1916 motors of Nov. 4.

Having overhead valves with very simple adjustment for the tappets, the space between the cylinders is not required for any adjusting process, and it therefore serves as an ideal place for the single unit lighting and starting apparatus. The complete eight still looks a quite small car, though a trifle greater in height than the four, and it has the same style of body.

Among the types exhibited there is a particularly striking speed model called the "Vitesse." It is rounded, high sided roadster, with the usual Scripps-Booth staggered seating, and has no doors, a couple of aluminum steps on the side giving access to the seats over the side. With very small mudguards front and rear and no running boards the car has a most rakish look.

Of the other cars, different body styles of less unconventional design are shown, and these differ little from the 1915 type. One alteration is abandonment of the quilted leather finish of the cowl board in favor of the more customary polished wood. In all the car has been improved considerably in both appearance and comfort by changes of small detail.

Haynes Twelve Neat Design

THE Haynes twelve-cylinder engine differs from the six considerably. The crankcase is similar and is interchangeable with that of either six, so far as fitting in the frame is concerned, but the valves are overhead, being operated from a central camshaft and long push rods. Each cylinder block has its valves in a detachable head, and the rocker mechanism is inclosed by aluminum covers, there being four of these in all. Tappet adjustment is on the ends of the rockers and is therefore very easy to make. A Delco distributer and ignition unit of much the same horizontal type as that used on the Packard engine, is mounted at the rear end of the motor, driven off the camshaft and the Leece-Neville generator is in tandem with the water pump on the crankcase side, just as on the Haynes six. The starting motor is located somewhat differently, being provided with a flywheel engagement.

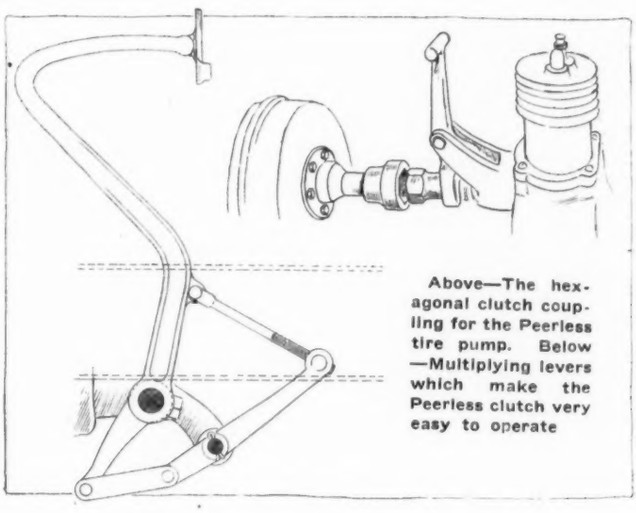
Oiling is by pressure throughout, and the pistons are aluminum alloy, the engine being intended for high speed. With bore of 2¾ and stroke of 5 in., the displacement is 356 cu. in. and the stroke to bore ratio 1.62, much above the average of American practice. The engine can be supplied instead of the six in either of the two Haynes chassis the specifications of the complete cars being otherwise unaffected.

H.A.L. Has Weidely Motor

THE second new twelve at the show is exhibited in touring car form and has the Weidely motor which is precisely similar to the engine as originally made. The body is a spacious seven-passenger type with high, straight sides and the radiator high and narrow with a squarish top, the impression given being distinctly speedy. Full specifications and other details are not yet in sufficiently definite shape to permit a more extended description.

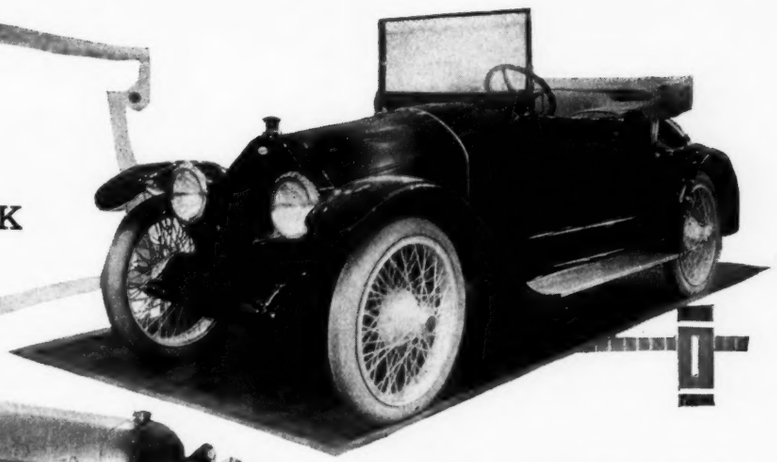
Sun Makes Own Motor

SINCE the announcement of the formation of the Sun company during last summer, a design has been developed, and the model car is shown for the first time. It will be built

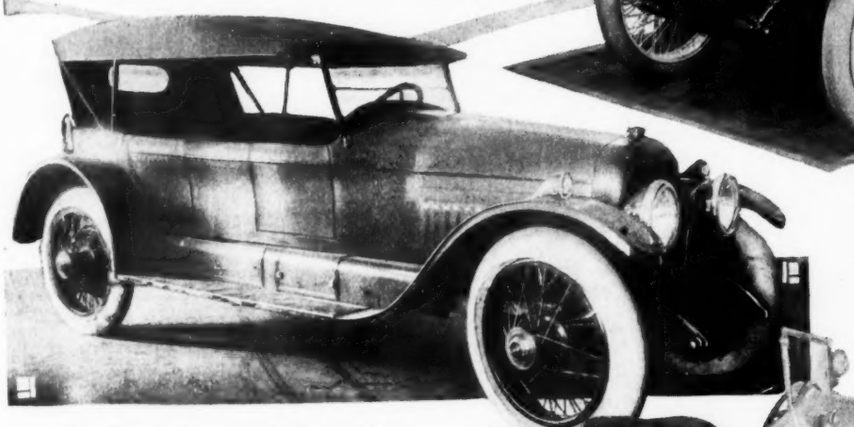


Above—The hexagonal clutch coupling for the Peerless tire pump. Below—Multiplying levers which make the Peerless clutch very easy to operate

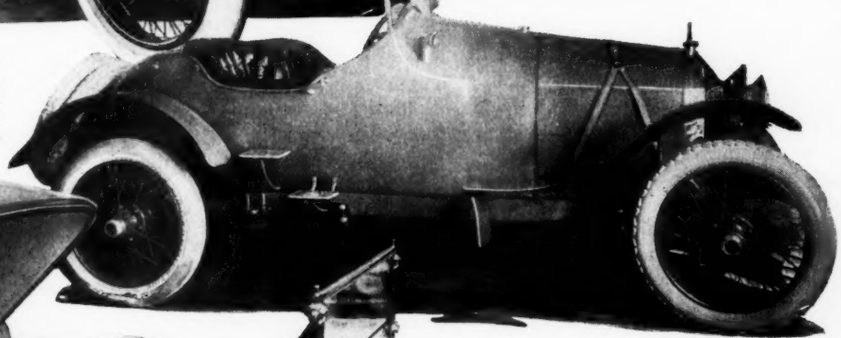
SAMPLES OF SHOW BODY WORK

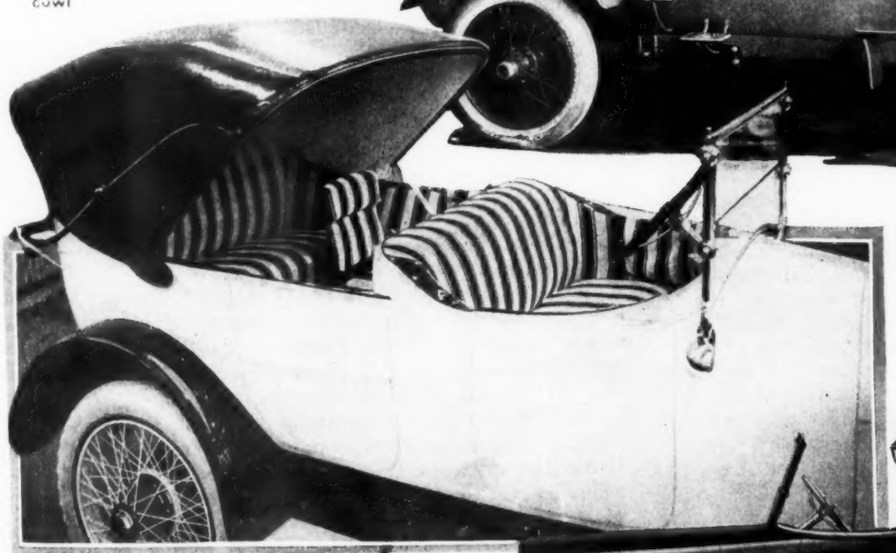


The roadster in which the driver sits slightly forward of one or two passengers who are accommodated side by side is almost as popular as the clover-leaf type. This Mitchell gives a good idea of the neat proportions obtainable

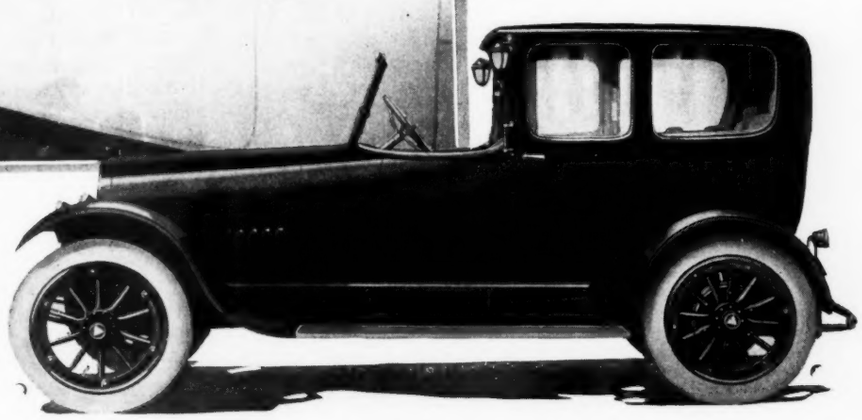


The Cunningham boat-shape body on the new eight-cylinder chassis. Note that the sides of the body are rounded inward at the upper edges so as to bend smoothly into the center cowl



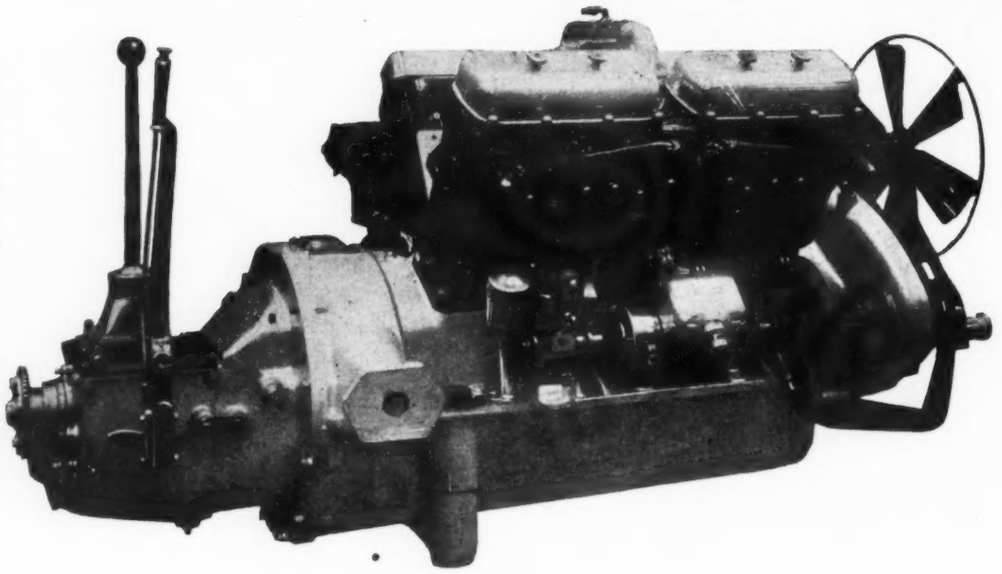


The Scripps-Booth "Vitesse," a much admired speed body in bright yellow coloring. Entrance is obtained by means of the cast aluminum steps on the side



The recent craze for black and white decoration was seized upon by several manufacturers desiring an original finish. This example was one of the best and was exhibited by the Paige company. The paint is dead white, even to the wire wheels

The Hudson Super-Six is shown with several styles of body. This town car is quite typical of modern bodies of its class and is one of the best designed in the show from the combined viewpoints of appearance and comfort



The Haynes twelve is a motor interchangeable with the sixes. It is an extremely neat overhead valve design with a long stroke and small bore. It may be observed that the exhaust manifold discharges into the pipe at its center and not from the end

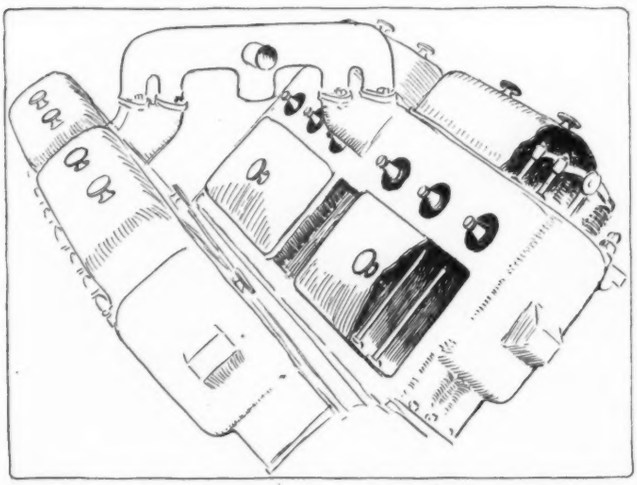
at Elkhart, Ind., and production will commence almost at once. The price of the five-passenger touring car will be under $1,000 but is not yet settled definitely.

The motor is a 3 by 5-in. six made in the Elkhart plant and having several special features. It is a block-cast job with crankcase in unit with the cylinders, and its chief outside peculiarity is that the exhaust manifold discharges into the pipe midway of the cylinders instead of at the end. At the center of the manifold a special part of the casting takes care of the hot air supply to the carbureter, which bolts to the cylinders direct on the opposite side of the block.

For the valves a finger tappet is used, something like that of the small Overland, and all the valve mechanism is thus both inclosed and lubricated. Oiling is by a flywheel system in which the lubricant is forced into the pipes by the centrifugal action of the wheel. It is stated that this motor has the highest compression of any stock motor.

Cooling is thermo-syphon and fuel feed the Stewart vacuum system, while the electrical equipment is to be Remy two-unit, the distributer being mounted in combination with the generator.

Another novelty is the use of a pressed steel "banjo" which is bolted between the crankcase and the gearbox in the middle of the bell housing, the ends of the banjo making the rear motor support on the frame. The rear axle is a floating pattern with pressed steel casing, springs semi-elliptic all around and the tires 34 by 4 in. Production will commence with a neat five-passenger touring car like that exhibited, and a roadster will be added very shortly afterwards.



The Haynes twelve has the valve rockers inclosed by aluminum covers and the push rods are also protected by cover plates of the usual kind. Note the accessibility of the spark plug

Lescina Fours and Sixes

SEVERAL of the Lescina fours and sixes are exhibited, these having been assembled in Chicago, but it is the intention of the company to open a factory in Newark, N. J. The cars will be assembled from good quality components, the precise make of which is not yet settled. The program calls for ten different types of bodies including touring, roadster and clover leaf passenger cars and a light delivery or express wagon. The frames are very wide so as to give the best possible support to the bodies.

The seven-passenger six is listed at $1,212 and the five-passenger four at $888, roadster bodies being alternative at the same prices. Ward Leonard lighting and starting is used.

Sterling Four Very Clean Chassis

SELLING for $595 with roadster equipment the Sterling is a new car in which low cost has been obtained by studied simplicity. The powerplant is a Sterling 3 by 4¼ in., with overhead valves and well lubricated rocker arms. A detachable head gives ready access to the valves.

Carburetion is taken care of by a Zenith instrument which is carried on the right side of the motor. The intake gases flow across the top of the head of the cylinder to the valve openings which are on the opposite side of the head from the intake port. Ignition is by the Wagner battery system in which the current is furnished from the storage battery and the balance of the system is made up of the Wagner distributer mechanism and a high-tension coil. The distributer drive is from the forward end of the timing gears which provides an accessible location. The high-tension coil is mounted on the side of the motor, giving very short connections between the breaker distributer mechanism and the coil.

Splash lubrication is employed, the oil being carried in the bottom half of the crankcase.

The clutch is a leather cone, and the gearset, which has ball bearings, is bolted to the crankcase by two arms that embrace the flywheel. Starting and lighting is performed by a two-unit system, the generator being driven by silent chain, and the motor making engagement by a Bendix pinion.

The frame is very wide, so that the cantilever springs at the rear can be mounted directly beneath it, thus giving direct support to the body. A neat rear axle is employed, this having wide brake drums with two sets of shoes in each, so there is no external brake, both service and emergency being expanding.

Anti-Rattle Devices For Quietness

Many Factors Aid — Coil Springs Popular for Brake Link Support

QUIETNESS in the motor would be unavailing unless provisions for quietness are made throughout the entire chassis. A study of the cars at the show reveals the fact that great strides have been made this year in cleaning up the little details which tend to develop rattles after the car has been in use for a time.

The result of this concentration on quietness is that the chassis of 1916 is cleaner than that of 1915, because it has fewer links and material better disposed in every particular. What few links there are are all provided with anti-rattling attachments, generally in the shape of coil springs which are always under tension and which prevent the motion of the car setting up a swinging or vibrating action in the links, causing noise.

Some good examples of how these coil springs have been applied to the links are in the Peerless, Cunningham and Hupmobile chassis. The Peerless makes use of springs which are quite lengthy to hold the brake links from moving while the car is in operation. On the Cunningham eight chassis there are double coil springs on the links.

Rectangular Link Rods

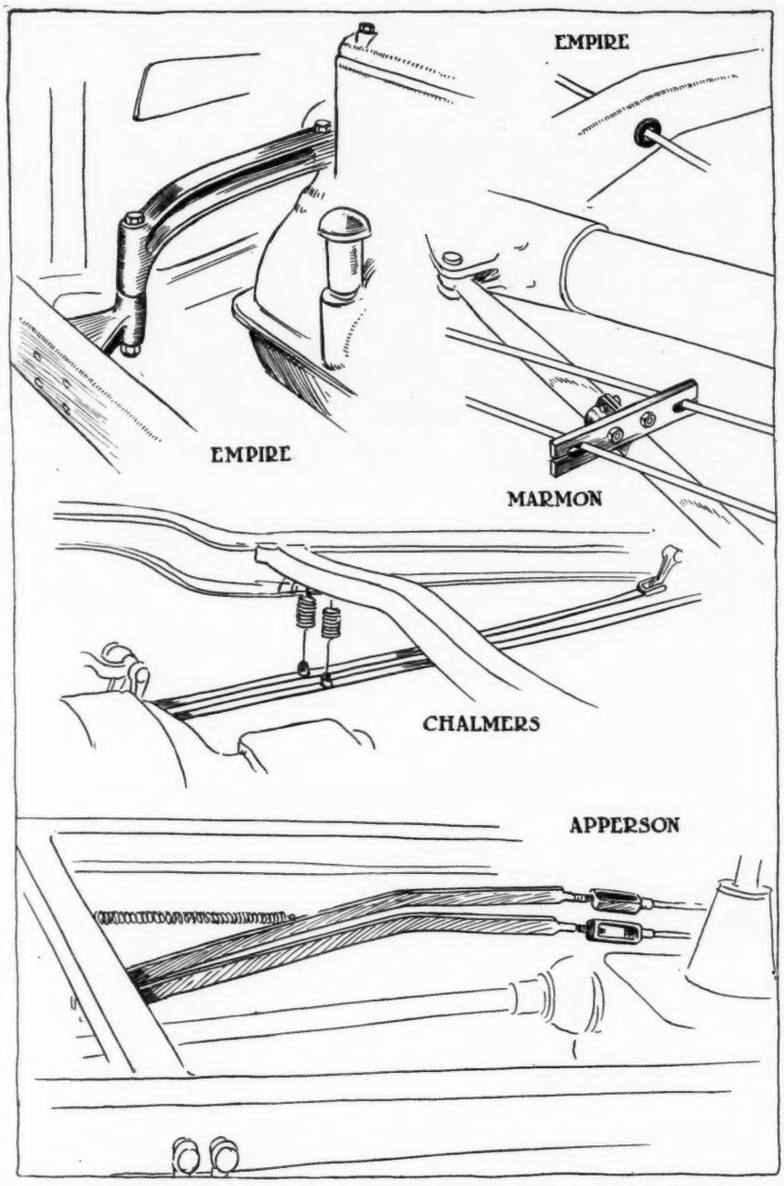
On some of the cars instead of using links and rods of ordinary circular section the sections are rectangular and either carried with the long axis horizontal or vertical. Apperson uses a link of oblong section with the long axis carried vertically, giving a very rigid connection for the brakes and at the same time these are rendered proof against rattling by the installation of very stiff springs. Chalmers has the bar link carried horizontally. The continuous rod which runs from the brake lever directly to the rear axle, where an equalizing attachment is located, is quite popular on many of the 1916 cars. These straight rods either pass backward clear of all the constructional detail on the frames or they may, on the other hand, pass through one of the cross members by means of a hole drilled for the purpose. When the latter method is used the rods are sometimes insulated from the cross member of the frame by a rubber ferrule which prevents the rod from striking against the cross member. In the majority of instances this long rod will pass below the cross member a considerable distance and there is no danger of any clash between the rod and the frame member.

Rigid Motor Mountings

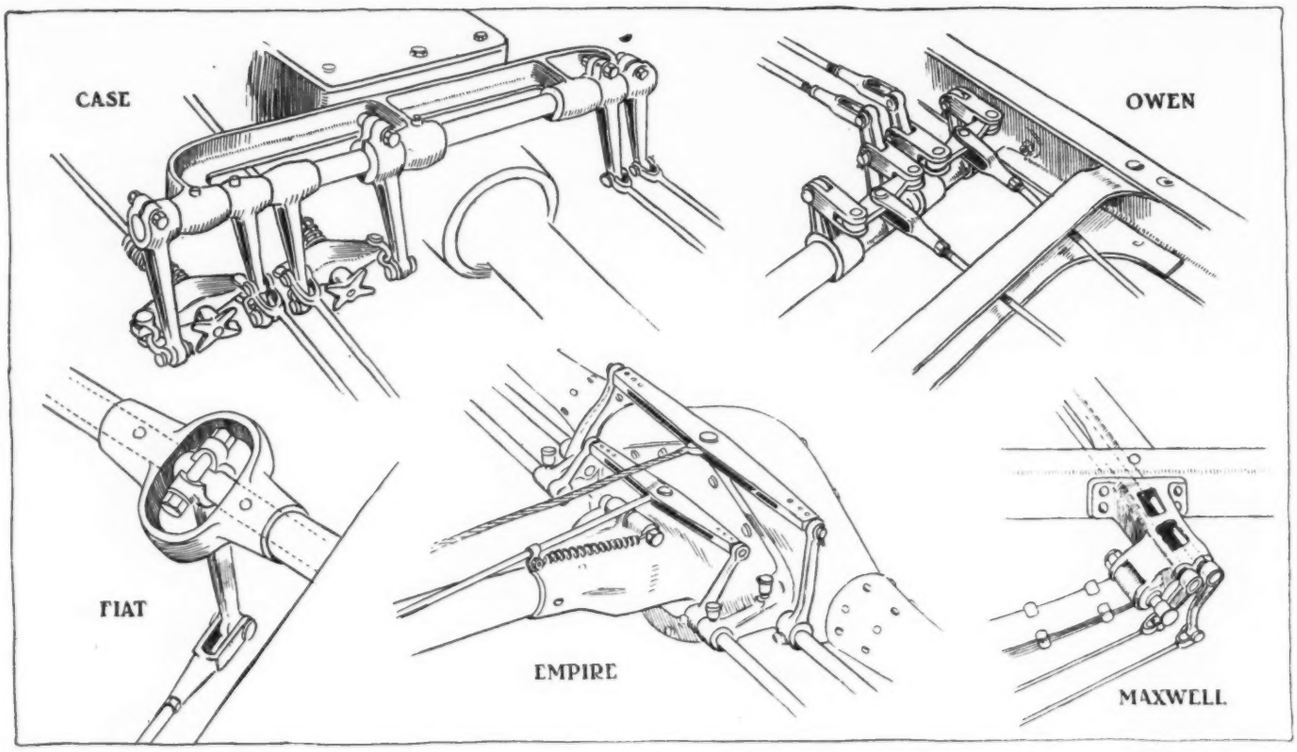
One of the interesting examples where minute detail has been taken care of will be noted on the Velie chassis, where any danger of the gasoline line rattling against the frame or other parts of the car is guarded against by means of small double eye-clips. The double-eye serves a two-fold purpose, one eye taking care of the gasoline line and the other providing a rigid fixture for holding the electric wire conduit in position.

Rigid motor mountings for the rear support, even in the three point suspension jobs, are important in the prevention of squeaks and rattles which are apt to develop if there is any working action between the supporting arms and the frame. The rear support of the motor is quite frequently anchored inside the channel beam on the 1916 cars instead of resting on the upper flange. With the unit power plant the rear supporting arms can be carried back further than on the separate unit jobs.

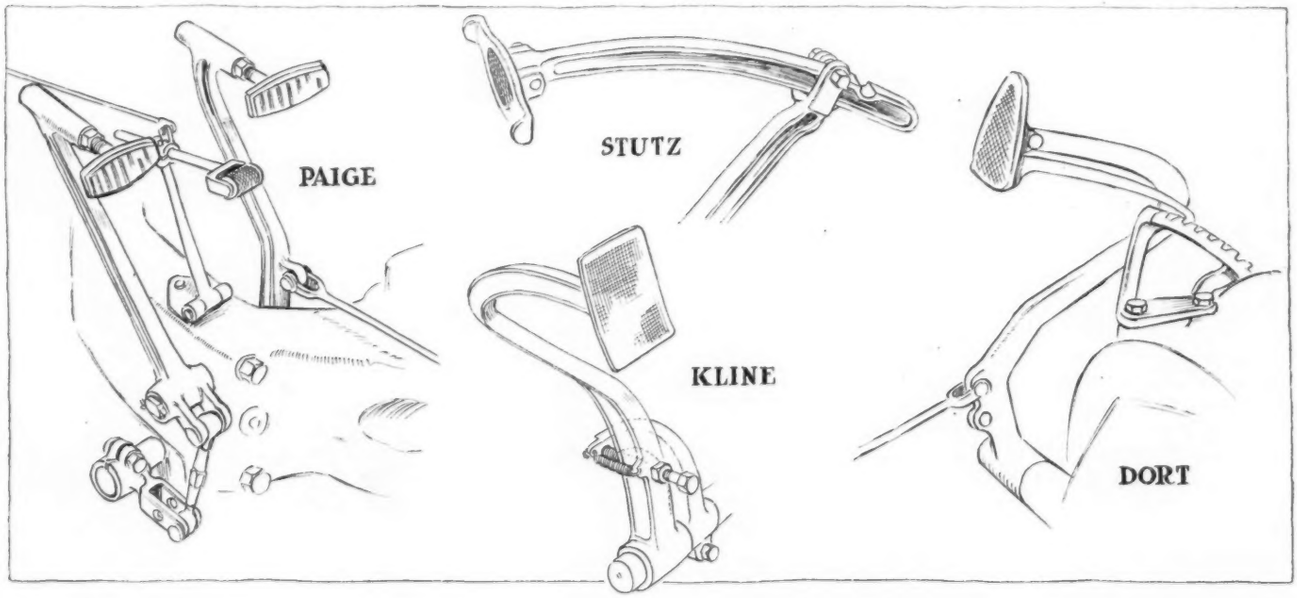
In connection with anti-rattling design the wide frames should be noted. These allow the body to be mounted directly over the side members of the frame and avoid the overhang which is frequently one of the causes of body squeak. The new Marmon car is a good example of this type of construction and the Hupmobile is also wide in the frame to take the body supports directly over the side members. Linings of woven fabric between the chassis and the body are also used to prevent the squeak which develops when the wood sill bears directly against the metallic frame structure.



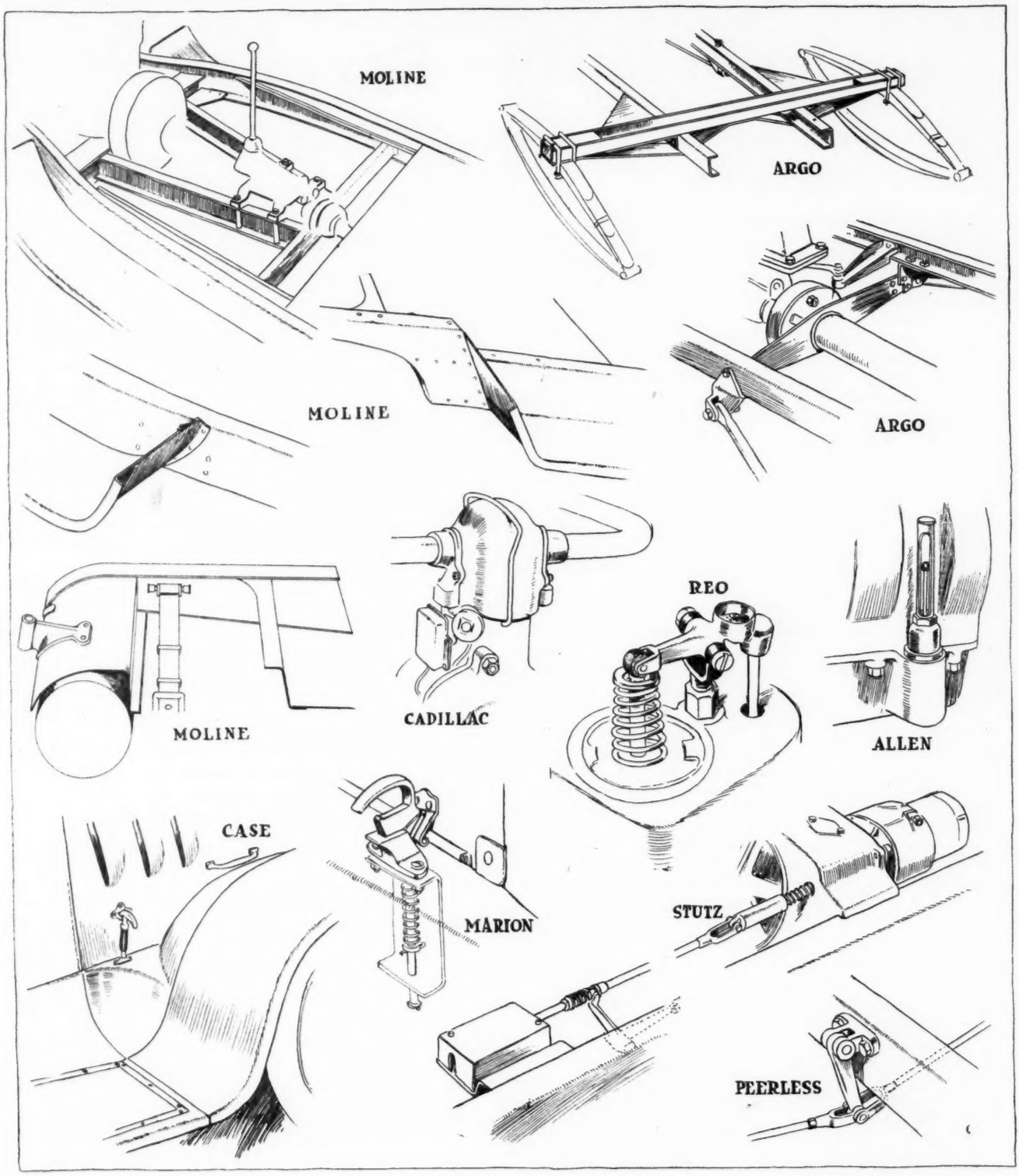
ANTI-RATTLING devices selected at random from miscellaneous cars at the show. The Empire motor support, Empire rubber insulated brake rod, Marmon wiring support, Chalmers coil spring link supports, Apperson rectangular section brake rods with coil spring. These are a few of the means taken to prevent the linkages of the car from developing noise after a few miles of travel.



BESIDES anti-rattle devices on brakework there are many different equalizing mechanisms to be studied. The Case has the equalizer beams mounted on the back of the gearbox, and takes advantage of this position to provide a convenient hand adjustment. Owen has a rather complicated, but efficient assembly on the countershaft. Empire was one of the first to use the rear axle location for the equalizers, and it may be noted that one pull rod and one stranded cable are used. Fiat uses an ingenious method for making the countershaft, the outer tube having a bridge piece to allow the lever from the rod to protrude. Maxwell makes use of the rear spring bracket to carry the brake countershafts, thus eliminating a pair of special brackets that otherwise would be necessary.



IT is customary now to find that a car has an adjustment for the brake and clutch pedals. The brake pedal usually can be set as to position by the forward end brake adjustment. These four sketches show different ways of giving adjustment for the clutch pedal. Paige threads the pedal piece itself and screws it into the end of the lever, and also goes to the trouble of providing an adjustment for the accelerator pedal, this being of a more simple nature. This is a very useful adjustment seldom thought of. Stutz uses a device fully explained by the cut, and this gives a very wide range of position to the pedal. Kline has a particularly neat adjustment, using a set screw and lock nut, the coil spring preventing the pedal from rattling. Dort has an original notion, and effects adjustability by providing a second hole at the bottom of the pedal, into which the brake-rod pin can be put.



IN these sketches are shown two extremes of frame construction. The little Argo has the narrowest frame ever used, the side rails being parallel and a stout cross member is attached at either end, the full elliptic springs being clipped to the extremities of these cross rails. It is inexpensive, and simple and is quite effective for a small car, though it is difficult to see how such a system could be applied to anything much larger as the bending stresses are considerable. The other cuts show the details of the Moline-Knight frame, which is highly scientific and uses thin sheet steel in peculiar sections. In this the running board is used to provide stiffness to the side rails to which it is riveted.

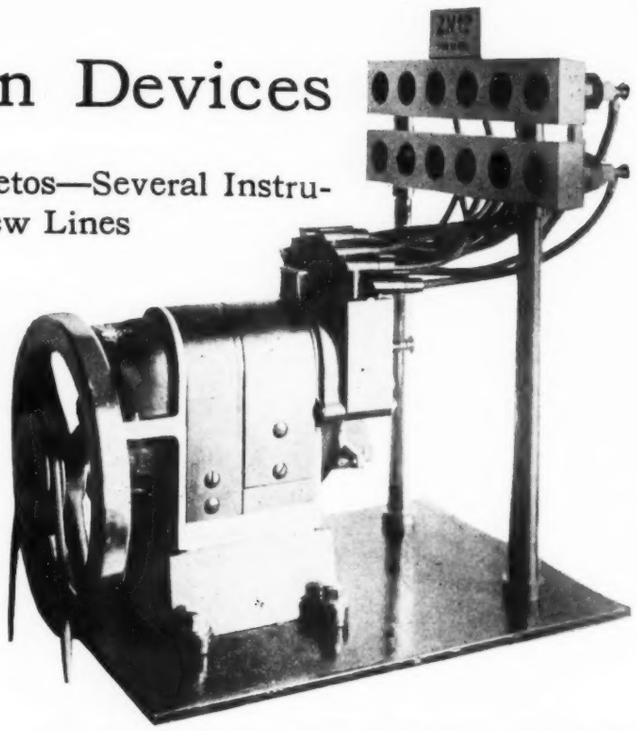
Other details shown are a dirt excluding cover with a wire clip over the Cadillac distributor, the Allen oil gage, the fiber roller and felt oil pad on the Reo valve rocker, and the link which connects the Stutz starting motor to the switch. The Case sketch is of a strengthener between the fender and frame to prevent rattle, the Peerless shows a means of carrying the brake operation beneath a cross member of the frame and the Marion is of a new hood catch which, by sliding down the wedge shaped socket is self-locking.

Surprises in Ignition Devices

Two New Twelve-Cylinder Type Magnetos—Several Instruments for Eights—Some New Lines

TWELVE-CYLINDER magnetos are the high spots in the ignition exhibits at the show. The Bosch Magneto Co. is showing for the first time the Z-N 12 and also the Z-N 8, which are new designs particularly adapted for twelve- and eight-cylinder motors. The K-W Ignition Co. is also showing a twelve-cylinder magneto, while the Ericsson Magneto Co. is exhibiting a new line of automobile types.

While the Bosch magnetos are entirely new they do not radically depart from previous Bosch design. The distinguishing features are the offset pole pieces and the novel arrangement of the high-tension distributer bridges. The series for eights and twelves is known as the Z-N and it very closely parallels the N-U series in that the current is gathered on a slip ring in the rear of the instrument and carried forward by current bridges. On these instruments there is a double slip ring which in construction resembles the result which would be accomplished by placing two of the regular Bosch slip rings against each other.



Bosch Z-N 12 magneto for twelve-cylinder cars; new at show

Double Distributer Used

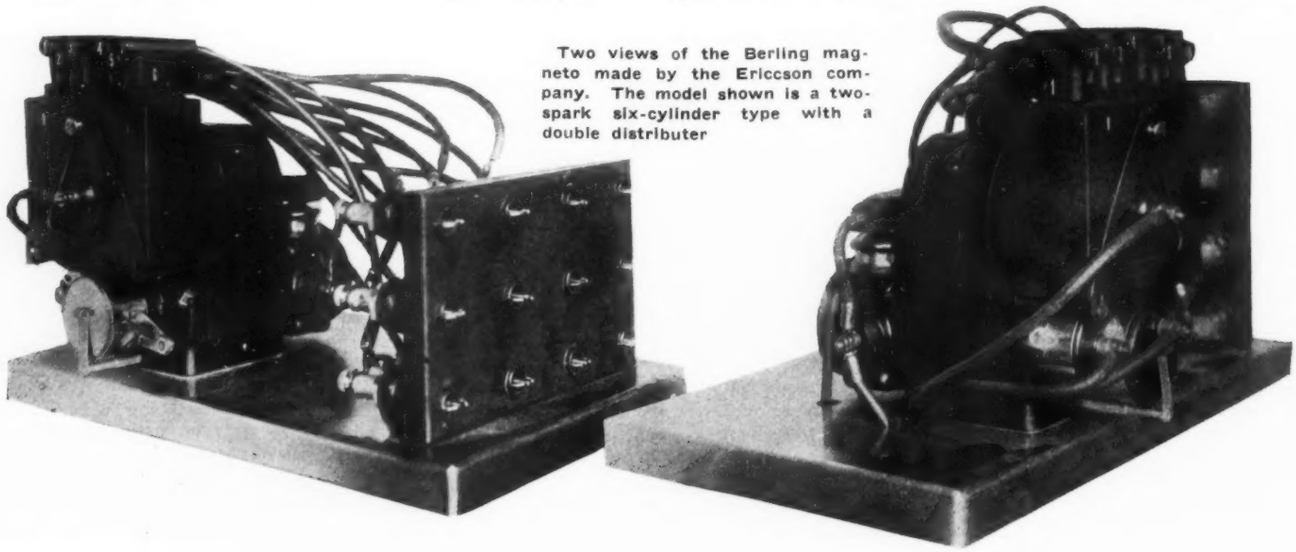
The distributer is double, as it has not been considered feasible to attempt to arrange the twelve distributer points around the circumference of one circle. Two distributer circles are used with the points so disposed that the current is taken alternately from each. In carrying the current from the lip rings to the distributer the forward unit in the slip ring is connected with the high-tension bridge which passes directly through the center of the magneto. The current from the rear slip ring is taken by a cable which passes out around the side of the magneto to the exterior distributer. Of course all this construction is within the magneto unit and is not visible on the exterior.

In order to take care of the current requirements of the twelve-cylinder magneto it is necessary that four sparks be produced in a revolution instead of two, as is ordinarily the case. This result has been accomplished by the use of offset fields, the pole pieces are so arranged that instead of two current waves being created in a revolution there are four, the field being in the form of a cross, so that at each quarter revolution the current attains its maximum. At first glance it might seem as if there was less field area than with the poles arranged to create two sparks in a revolution. This has been offset, however, by the use of higher magnets and the result is that although double the number of sparks are created the intensity of each individual spark is as great as in the previous Bosch models.

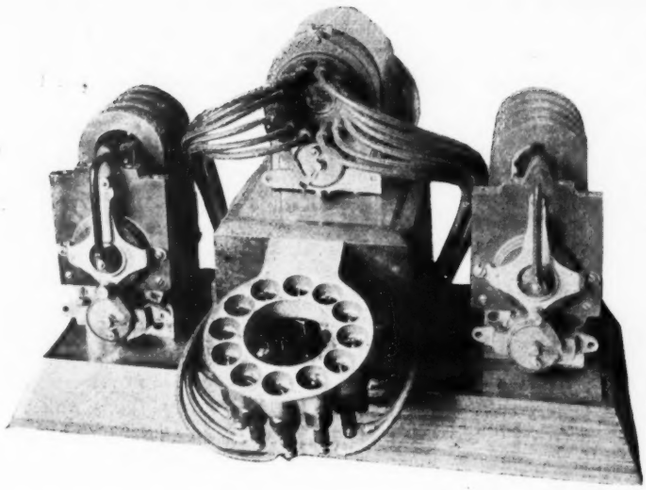
At the Bosch exhibit one of the twelve-cylinder models is shown mounted on a Packard twelve motor by means of a standard fitting which the Bosch company is marketing.

K-W Magneto for Twelves

The K-W magneto for twelves is constructed along the same lines as the larger machines put out by this concern. In producing the ignition requirements for the twelve-cylinder motor four sparks are given in a revolution, due to the use of cross poles. The twelve-cylinder magneto is driven at 1½ times crankshaft speed and the eight-cylinder magneto at engine speed. The visible distributer is one of the interesting points



Two views of the Berling magneto made by the Ericcson company. The model shown is a two-spark six-cylinder type with a double distributer



K-W magneto for twelve-cylinder motors. This is new at the show

of this magneto. The distributer box is provided with a mica cover whch permits of observing the action of the distributer while the magneto is running. This instrument is now manufactured for two-, three-, four-, six-, eight-, ten- and twelve-cylinder engines, and it is provided either with or without the K-W impulse starter as desired. This impulse starter operates on a set figure arrangement which is released when the engine is cranked, giving momentarily a high armature speed to create a good spark for starting.

Heinze Magnetos for Eights

Heinze magnetos are now made in eight-cylinder units under the model name of B-8. With these magnetos two ignition sparks are produced during each revolution of the armature. The eight-cylinder magneto does not vary from the regular Heinze product except in the number of distributer points. The magneto is featured by the round section magnets and the round armature. The object of using the circular construction is to permit of the minimum amount of wire length in the primary and secondary circuits in order to cut down internal resistance.

The Price company is showing a combined ignition, lighting and starting unit which promises to be of interest, as the unit not only includes the lighting outfit and generator parts but also the breaker mechanism, high-tension distributer, coil and condenser. These are combined in a compact unit which weighs comparatively little in consideration of the large number of functions taken care of. As the exhibits are not yet complete, due to the non-arrival of samples which are promised during the week, a complete technical description is not as yet available.

Auxiliary Ignition by Battery

The New York Coil Co., New York City, is showing a battery ignition system which is designed to cause any high-tension magneto to deliver a vibrating spark for starting.

The device consists of a low-tension vibrator coil which is in series with the battery and low-tension circuit of the magneto. The coil is a specially wound mechanically operated device, including a circuit breaker and condenser somewhat resembling a Master vibrator in principle. With this is supplied also a kick switch which when turned to the battery position places six dry cells in series with the vibrator and low-tension winding of the magneto. When the magneto is revolved, tc the position where the breaker points on same separate, a rapidly made and broken battery circuit flows through the armature. This induces a vibrating spark in the secondary winding of the magneto and this spark is distributed to the proper cylinder by the regular distributer mechanism of the magneto.

Gives Magneto Advantages

When the switch is turned to the opposite side marked magneto, the magneto operates in the usual manner and is in no way connected to the battery. This gives all the advantages of high-tension magneto ignition.

As the switch is furnished separate, with wires attached, it may be located at the driver's side of dash allowing the vibrator mechanism to be installed on the engine side of the dash in any position or location most convenient.

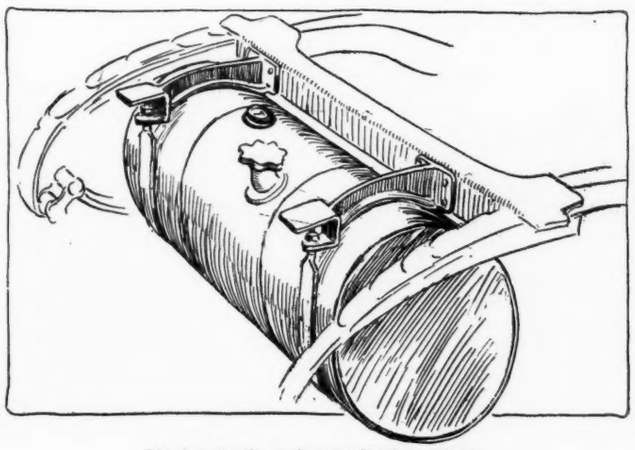
The price of the outfit is $8 and it is especially designed to fill the wants of those who desire easy starting in connection with single magneto ignition.

Circular Gasoline Tanks Increasingly Popular

WITH the coming of vacuum feed and the abolition of the cowl tank we find many low-priced cars with the tank at the rear of the chassis. The tank shaped to fit the frame must necessarily be a special product and costs much more to make than a plain cylindrical tank, while weight for weight the cylindrical pattern should be the stronger. Thus it is noticeable that many of the cars in the show have rear tanks of round section, clipped in stout brackets that are riveted to the end of the frame.

These brackets often serve as tire carriers also, so things are developing toward a sort of "tire and tank assembly" as a unit for frame attachment. If the coming of the round tank continues, and the use of tanks made by specialists increases, as seems likely, the situation offers an opportunity for standardizing work. Tanks at the end of the frame are always a little liable to damage and two or three standard diameters should meet all requirements.

Another advantage of the round tank, is the ease of removing it from the frame. This is a job that is seldom necessary, but when a car has run a whole season it is usually a good thing to clean out the tank so as to remove any accumulated dirt, rust or moisture, and so save the necessity for cleaning out the carbureter from time to time. Old cars are much more liable to suffer from dirt in the carbureter than are new ones, and this is largely because of the gradual deterioration of the inside surfaces of the tank. To clean out a tank efficiently it needs to be shaken thoroughly when partially filled with some cleansing substance and this is much more easily performed with the tank detached.



Marion tank and combined brackets

Valve Accessibility Improved Considerably

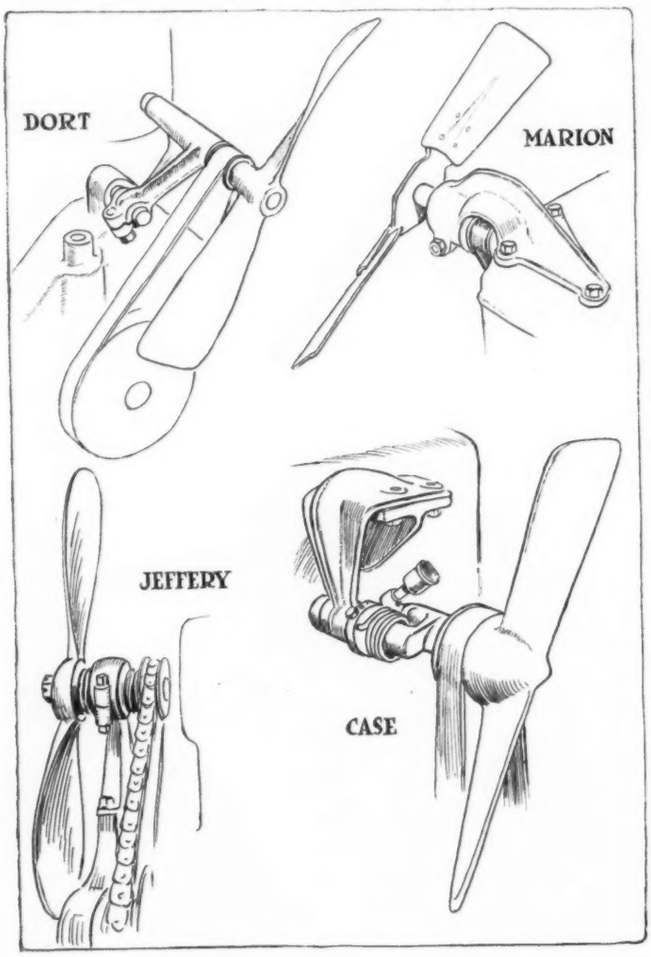
Many Factors In Problem

THE accessibility of valves is now less important because they are far less liable to give trouble than used to be the case, but accessibility of tappet adjustment becomes important in direct ratio with increase in motor efficiency. A slack tappet can seriously impair the power output of a motor of the high-speed type. Thus it is natural to find that makers of high-efficiency engines are doing all they can to render the adjustment of a tappet an easy job that can be performed by anyone.

To set a tappet needs usually, two spanners, one to hold the lock nut and the other to turn the tappet till it clears the valve by the right amount, so a fair amount of space in the vicinity of the valve stem is necessary.

Remove Accessories from Valve Side

There is a marked trend toward the removal of accessories from the valve side of the motor, so that removal of the valve inclosing cover lays bare the tappets and the spanners can be got to work without trouble. On the most modern sixes this quality can generally be found, developed to a high pitch of perfection. The V motors, with the exception of those with overhead valves which are the easiest of all to handle, are mostly open to criticism. In but few instances could any man other than an expert mechanic adjust *all* the tappets without first detaching some accessory or other. Usually it is easiest to remove the carbureter, but this generally comes away very easily with the intake manifold. There are some V engines, however, where even this step is not necessary.



The most powerful influence for good on vertical motors, either fours or sixes, has been the trend to the use of the offside mounting for the carbureter which leaves only the exhaust manifold on the valve side.

Electrical equipment is being mounted lower than before, and the generators are actually smaller, which reduces the interference that they may create. In very many cases the generator also is on the carbureter side which leaves the valve side completely clear.

The growing importance of keeping tappets well set up brings to the fore consideration of the possiblity of devising something better than the customary set screw and lock nut. It does require some skill to make the adjustment properly however much room may be given, and it ought to be pssible to find some self-locking device that would require only one nut to be turned. With overhead valves the simplest setting is obtainable by an adjustment on the fulcrum of the rocker and something similar should be discoverable for the L-head engines.

With Detachable Cylinder Heads

Ease of removing or grinding in the valves is greatest, usually, in detachable head motors and the only criticism that can be levelled against the latter is that some of them seem to have a needless number of nuts and studs. There is a good deal of difference in practice in this respect, but the minimum number that will serve is the best from the car owner's viewpoint.

It is noteworthy that few manufacturers consider it worth while to break the detachable head of a six-cylinder motor into two portions, the block head generally going with the block casting, but the owner is rather inclined to prefer handling the divided type as the ease of making a proper joint is certainly greater when the head does not cover more than three cylinders. Still, the block head is simpler, and it is also better from the point of view of proper water circulation and cooling, so the makers are probably right in their preference.

Two Blade Fans in Vogue

Many New Examples at Show

THE number of cars at the show with two bladed fans is quite remarkable, considering the comparative rarity of this type a year ago. A fan with two blades, properly made, will draw more air than any other type, but the cheap construction given by the pressed steel fan with four blades or more seemed till recently as though it would drive the more efficient pattern from the field.

The four examples of two-blade fans shown in the accompanying illustration have been picked at random as showing the difference in makers' ideas. The Dort design is a simple aluminum casting with thin blades and not a very steep pitch which remarks apply with equal force to the Jeffery fan. The Case, on the other hand, has very wide blades of an extremely steep pitch, and must be capable of creating a perfect gale of wind. The steel blade, which is practically as effective for automobile purposes and is less costly, is seen in two blade form on the Marion. It is not quite so pretty in appearance as the aluminum type, but the latter has no advantage on the score of weight.

How Many Horsepower to Run a Fan?

It would be interesting to make careful experiments as to the amount of power required to drive some of the bigger fans, at the high speeds to which they are geared to run. There are a few examples which, if the detail shape of the blades is correct to aeroplane practice, must easily need 4 or 5 hp. at a couple of thousand revolutions per minute.

S. A. E. Debates Important Matters

Annual General Meeting of the Society Elects Russell Huff President for 1916—Members to Discuss Papers on Magneto Versus Battery, on Steel and on Electrical Equipment—Many New Standards Adopted

WITHOUT doubt the great attraction of the S. A. E. meeting this year is the argument staged for Thursday, Jan. 6, when the opposing factions will take the floor in debate on the momentous questions arising from different ignition systems.

It is a triangular duel that has been arranged, between magneto, closed circuit battery and open circuit battery. The papers are given by Francis B. Hoyt for the magneto, Frank Conrad and Alexander Churchward figuring as protagonists of the battery.

Another paper of equally great importance, though more deeply scientific is by Dr. Unger on the sulphur content in steel.

Joseph Bijur will also deal with the electrical equipment of another sort, taking as his sphere the construction of lighting and starting apparatus, and Henry Schroeder will describe the design and manufacture of small electric lamps. Abstracts of these first four papers are to be found hereunder and the discussions of all the papers will be given fully in the next issue of THE AUTOMOBILE.

Standards Committee Active

During the whole of Monday, Jan 3, sundry of the standard divisions met and finally discussed their reports to be presented to the full Standards Committee meeting to be held next day. On Tuesday morning proceedings commenced in the Society's offices and the report of the day's work is given on page 21.

Ignition Papers Controversial

The discussion on the ignition question is sure to be very hot indeed, and to give a fair view of the leading off position it is better to review the three papers than to publish them in full previous to the discussion, which it is to be hoped will be successful in actually settling some part of this vexed question.

The Magneto Argument

Mr. Hoyt has prepared the longest of the three papers, and he gives a summary at the end which may be quoted.

For the best results the spark in an engine cylinder must occur at a time depending on the speed with which the gas can burn.

Spark advance, while necessary, is often (though inefficiently) used as a substitute for spark heat.

The unavoidable errors nearly always present in spark timing can be compensated for to a great extent by increasing the spark heat.

The open circuit battery system relies entirely on spark advance for meeting varying engine conditions.

In the closed circuit battery system the spark grows weaker as the speed increases, which is wrong.

The larger the spark the faster the flame spread and the greater the efficiency.

A prolonged spark is necessary for advanced positions owing to vapor variations in the cylinder.

The magneto spark, increasing in intensity with the speed, is directly suitable to the requirements of an engine."

Battery Viewpoint Is Different

Such statements cannot go unanswered, but neither Mr. Conrad nor Mr. Churchward have made positive statements in their papers which can be used as answers to the accusations made by Mr. Hoyt. Both have tackled the subject from somewhat different angles. The former author states positively that the long enduring spark has no value, because directly the small body of gas surrounding the spark plug points has been burnt any continuance of sparking can have no effect upon the rest of the gas in the charge. He also states that a shortcoming of the magneto is that the voltage of the spark is limited, whereas the battery spark can be of any voltage desired.

Broadly the view taken by the two battery protagonists is that the remarkable success of the magneto compared with that of early battery systems lay in the superiority of magneto breaker mechanism. That to-day the battery systems have improved breakers till they equal or excell those of the magnetos. In other words that the battery ignition has been brought to perfection by following mechanical development rather than electrical.

Taking a quick impression from the

Russell Huff

Russell Huff, president-elect of the Society of Automobile Engineers, is chief engineer of Dodge Bros., which position he assumed Nov. 1, 1915. Previous to that date President Huff was connected with the engineering department of the Packard Motor Car Co. It was on June 25, 1900, that he associated himself with the Packard organization in the drafting department. In 1905 he became chief engineer of the Packard organization. In 1907 he joined the Society of Automobile Engineers and since that time has been one of the active members both in general policy work and also in committee work. He was vice-president in 1913. Previous to his active connection with the S. A. E. work, President Huff was lending his best efforts to the mechanical department of the Association of Licensed Automobile Manufacturers, which maintained an experimental and testing laboratory at Hartford, Conn. President Huff has several thoughts in mind for his terms as president, one being increasing the membership very materially; another is the encouragement of an engineering digest of American and foreign literature; and the third is devoting more attention to the finances of the society.

three papers a study of the many diagrams and photographs of sparks taken with elaborate scientific instruments suggests that the battery ignition spark can be made to do pretty much the same as the magneto spark except to last longer and longer as the speed increases. That there will be a very hot discussion goes without saying, and it is impossible to even guess what way the feeling of the meeting will trend. The three papers are each able expositions of different aspects of the electricity and the mechanics of ignition, yet they cannot all three be right in their conclusions. Perhaps the discussion will enable the balance to be struck, and if it does those who take part will have reason to be proud of having aided to settle the most burning question of the day.

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Sulphur Content May Be Raised

—

Tests Show Open-Hearth Steel Little Affected by Reducing Sulphur Below 0.1 Per Cent.

—

By Dr. J. S. Unger*

THAT the sulphur content of basic open-hearth steels has been given a fictitious importance is the opinion of so great an authority as the author of this paper. It is Dr. Unger's contention that if sulphur is held down to 0.1 per cent that is low enough for all purposes for which basic open-hearth steel is commonly employed. To test his theory Dr. Unger had a series of steels prepared, containing various amounts of sulphur from 0.025 up to well over 0.2 per cent. These steels were manufactured in the ordinary way and from them many sorts of articles were made by ordinary processes, the idea being to not only test the strength of the steel as first made, but to test it after it was in the finished form. All sorts of things from sheet steel stove pipes to automobile crankshafts were made and in a fairly lengthy paper Dr. Unger tells what happened to the various steels in manufacture of the sample parts and in the testing machine afterward.

The results go to prove that the results are not noticeably improved in any way by cutting down the sulphur below 0.1 per cent. Below is the introduction to the paper which explains Dr. Unger's ideas, which was followed by an account of the detail adopted in making the steels and finally, a series of tests are quoted with their results. Of these, one table, characteristic of the whole, is given below.

Introduction to Paper

During the last fifteen years the proportional tonnages of steel manufactured by the Bessemer and open-hearth processes have undergone a great change. During 1900 about 65 per cent of the total tonnage of steel made was Bessemer and 34 per cent open-hearth. In 1914 about 26 per cent was Bessemer and 73 per cent open-hearth. Of the latter 94 per cent was made by the basic process.

As the low phosphorus ores became scarcer, higher phosphorus ores supplanted them. The latter produced a pig iron too high in phosphorus to be used in the acid Bessemer process; consequently the basic open-hearth process, with its attendant purification, grew rapidly.

Wherever Bessemer steel has been used, the sulphur content has varied from 0.050 to 0.080 per cent, or even higher, depending on whether the iron was used direct from the blast furnace or remelted in a cupola. Millions of tons of Bessemer steel, containing an average of 0.070 sulphur, have been used for almost every purpose. The greater part of such steel is still in service, giving an excellent account of itself, and furnishing us with the best possible evidence that steel may contain a reasonable amount of sulphur without being injured in quality.

With the advent of basic open hearth steel the consumer found that from 0.040 to 0.050 per cent sulphur, or about two-thirds that of the Bessemer, was the usual sulphur content of such steel. Believing that high sulphur always indicated that the steel was bad, he naturally insisted on the lower limit, or below 0.040 per cent sulphur in his steel.

Sulphur in steel, whether justly or unjustly, is in many cases held responsible for the bad working of steel. As a result the specifications covering the allowable amount of this element have been gradually lowered until in certain cases below 0.030 per cent is the limit demanded. It is very difficult to reach this limit by the basic open hearth process, and when reached there is a grave doubt in the minds of many whether the quality of the steel has not suffered by the excessive purification required to produce such results.

It became almost the universal practice when steel showed a tendency to work badly or become red short to make an analysis of the steel. If this analysis indicated that the steel had the proper or permissible amounts of the usual elements but happened to be a few thousandths of a per cent higher than the permissible amount of sulphur, the sulphur was held responsible for the trouble. Such decisions are made without considering other causes occurring in the manufacture of the steel; such as the heating and rolling and subsequent operations in working it up into a finished product.

The manufacture of steel in quantities of several tons at one time began when the Bessemer process was introduced about fifty years ago. Chemical analyses at that time were crude, or not made at all. Failures due to poor raw material or improper metallurgical treatment were common. Sulphur was largely blamed for such results, and a strong prejudice against it was established. This belief was handed down from one person to another. Rarely has it been questioned, nor have many efforts been made to establish the truth, until at the present time few are ready to believe that Sulphur up to a reasonable amount, say under 0.100 per cent, does not affect or at the most only slightly influences the working properties during manufacture, or the quality of the finished steel.

Effect of Low Sulphur on Steel

Some steel making processes have been brought forward which produce a steel lower in sulphur than the basic open-hearth process, but where the author has had an opportunity to compare such steel with open-hearth steel having the same physical properties, no difference could be detected in the surface produced or the hot working properties.

The subject of sulphur in steel has been studied by others. Results have been published in which soft steel and wrought

Carbon Content	Sulphur Content	Elastic Limit, Lb. Per Sq. In.	Tensile Strength, Lb. Per Sq. In.	Elongation in 2 In. Per Cent	Reduction of Area, Per Cent
.32*	.032	48,650	80,250	30.5	70.1
.32*	.068	48,550	75,550	32.8	68.8
.32*	.108	46,400	75,800	30.2	68.7
.32*	.146	46,700	73,350	31.5	67.3
.32*	.190	45,450	71,550	33.2	66.3
.32*	.230	45,850	70,100	31.5	65.0
.51†	.025	70,400	111,900	20.3	56.8
.51†	.055	76,300	120,800	19.7	51.3
.51†	.095	73,950	119,400	19.5	51.5
.51†	.135	76,800	120,600	18.3	49.2
.51†	.167	73,200	111,750	17.5	45.4
.51†	.230	66,350	106,550	20.5	44.7

*Heated to 830 deg. C., held for 20 minutes, quenched in water drawn at 600 deg. C., for 30 minutes.
†Heated to 816 deg. C., held for 20 minutes, quenched in water drawn at 565 deg. C., for 30 minutes.

*Extracts from a paper presented at the annual meeting of the S. A. E., Jan. 6, 1916.

iron containing 0.300 to 0.600 per cent sulphur have been successfully forged. The details are lacking, but it is my belief that such material would stand very little heating to a high temperature for forging without cracking or crumbling during the forging operation. I have in mind an investigator who has recently studied the effect of sulphur in different heat treatments of steel, with sulphur ranging from 0.032 to 0.157 per cent. Another studied its effect in rivet steel, containing from 0.042 to 0.105 per cent sulphur; a third in drop forgings containing from 0.028 to 0.190 per cent sulphur. Their results agree in this point: When other conditions are equal, no marked differences were observed in the working properties or in the quality of the finished material.

Headlight Glare Defined —New Standards

Recommendations of Spring Division and Resolution on Headlight Glare Adopted—Solid Tire Standards

NEW YORK CITY, Jan. 4—The standards committee of the S. A. E. met this morning to consider a large number of reports presented by different divisions. The reports accepted by the committee will be submitted to the general meeting of the society to-morrow. Foremost among the work of the day is the adoption of a resolution proffered by the electrical equipment division on the subject of headlight glare which reads as follows:

> *Wherever there is not sufficient light within the limits of the highway location clearly to reveal all persons, vehicles or substantial objects within said limits for a distance of at least* 150 *feet, the headlights of any motor vehicle in motion shall give sufficient light to reveal any person, vehicle or substantial object on the road straight ahead of such motor vehicle for a distance of at least* 150 *feet.*
>
> *The headlights shall be so arranged that no portion of the reflected beam of light, when measured* 75 *feet or more ahead of the lamps, shall be over* 42 *inches above the level surface on which the vehicle stands. Such headlights shall also give sufficient side illumination to indicate any person, vehicle or substantial object* 10 *feet to the side of said motor vehicle at a point* 10 *feet ahead of the lamps.*
>
> *The term "beam of light" as used in the above provision shall be construed as meaning the approximately parallel focalized rays gathered and projected by a reflector, lens or other device.*

The division further reported that it had had the subject under consideration for over two years and that almost every anti-glare device on the market had been examined. The report continues:

"It will be noted that the fundamental idea is the securing of adequate illumination, and the direction of the light in such a way as to render it unobjectionable to users of the highway. In view of the widespread approval which this provision in substantially its present form has received from legislators, municipal executives and safety organizations, and in view of the sound engineering foundation underlying it, the Division bespeaks for this provision the serious consideration of all interested in the securing of adequate and unobjectionable illumination."

Before the passing of the resolution there was a vigorous discussion in which several members of the committee voiced the opinion that the definition was not close enough. It was suggested that the actual spherical candle power of the light at 150 ft. ought to be stated and stress was laid upon the different degrees of visibility of different colored objects. The supporters of the resolution, however, answered this criticism effectively by pointing out that its object was to provide something easy to test, and simple to operate that might serve as a basis for the many different bodies who are just now trying to define headlight glare.

Another recommendation of this division adopted by the standards committee was in connection with the detail dimensions of insulated wires of different sorts intended to assist the manufacture and purchase of wiring suitable for automobile work. A third recommendation, also accepted was the following.

Location of Slots in Headlight Receptacles

"The Division recommends that the standard position of the slots in headlight bulb receptacles be so fixed that the anchor pins of the bulb when installed shall lie in a horizontal plane.

"Compliance with the above recommendation will improve very materially the situation so far as half-frosted or other partially opaqued bulbs are concerned. This may not result immediately in a definite disposition of the filament with respect to the anchor pins but it is hoped that the removal of this one variable will encourage the bulb-maker to bring about the best possible relation between those bulb elements involved in the proper direction and distribution of the light."

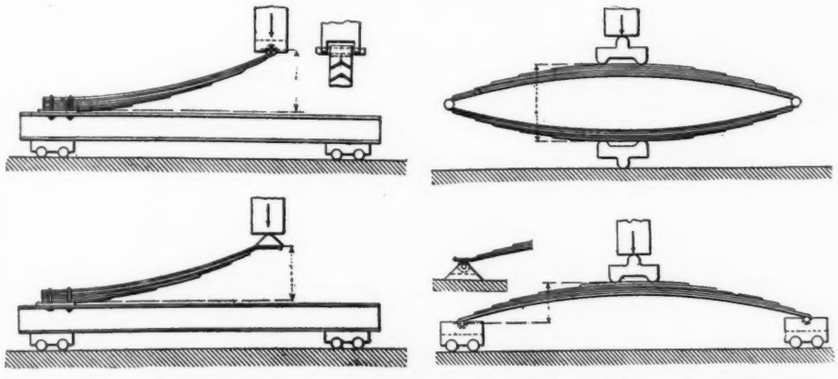
Iron and Steel Report Voluminous

The report of the Iron and Steel division of the standards committee deals entirely with details of testing of materials. It is proposed to substitute this fresh report for the whole of the "notes and instructions" appearing under the head "Carbon Steel" in the last published list of S. A. E. steel specifications.

A second portion deals with the details and dimensions of the standard test specimens and the object of both revisions is, in the main, so as to conform more closely to the practice of the Society For Testing Materials. The committee accepted the whole of the report without discussion and, since it is of considerable importance, the text is reproduced at the end of this account of the meeting.

New Solid Tire Standard

It is well known that for several months past an endeavor has been made to prove that two sizes of solid tires, namely 36 in. and 40 in. nominal, to fit on two standard S. A. E. wheels would be sufficient for all needs. But it has been ascertained that the demand for a 34-in. solid tire is so large



Diagrams of standard methods for spring testing for quarter-, semi- and elliptic springs

that to neglect this size is impossible. Therefore the standards committee has adopted as S. A. E. standards the three sizes of 34 in., 36 in. and 40 in.

Also accepted for approval of the general meeting on Thursday is a new standard for the tires of industrial trucks, this specifying four sizes, 10 in., 16 in., 22 in. and 27 in. Both these matters are in the sphere of the truck standards division, and this body asked for a return to the use of ¼ in. felloe band for 4 in. section tires as this had proved adequate. The present standard calls for ⅜ in. This also the standards committee approved.

Pump Bases and License Tags

The subject of pump bases and brackets for license tags was the main theme of the report of the miscellaneous division. These standards were dealt with at the Chicago meeting and fully described in the report of that gathering. The only new standard to be added under this head is one for water hose as used in motor and radiator fitting. The table below shows the new standard as adopted by the committee.

The miscellaneous division reported that it was working on the matter of standard piston rings and hoped to be able to announce something definite before long.

Spring Tests Standardized

Another report accepted as printed was that of the springs division. This specifies methods for testing springs and lays down what shall be fair tests, specifying what the consumer may demand of the spring maker. The diagrams herewith are taken from this report and show the variety of test considered, and the report contains the fullest possible instructions for testing.

Other Business Done

Other divisions reported progress and indicated that the work of the standards committee is in a very healthy condition. First it was stated by Chairman K. W. Zimmerschied that the work in connection with the nomenclature of automobile parts was going forward, the assistance of many manufacturers and service men having been enlisted. The list of names for motor parts was complete and that for the remainder of the chassis in good shape, so that it is hoped a full set of names may soon be in fit state to present to the society.

The electric vehicle division reported as follows on the subject of speed and mileage ratings for electrics:

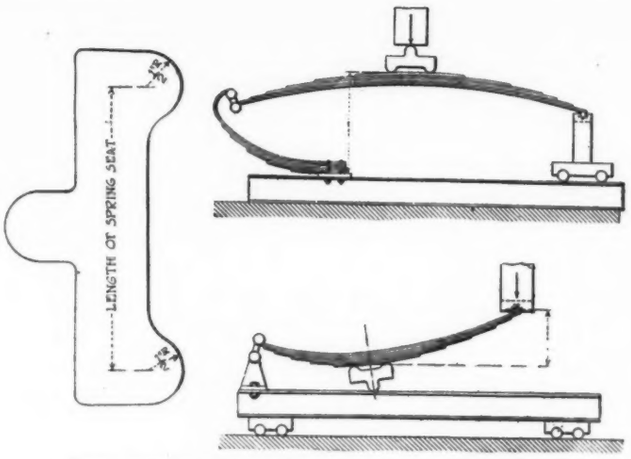
"Electric vehicle speed ratings shall be based on continuous operation with one-half load over hard, smooth and level roads or pavements at the actual average battery voltage.

"Electric vehicle mileage ratings shall be based on a continuous run at the S. A. E. rated speed with one-half load over hard, smooth and level roads or pavements.

Table I—Sizes of Hose-Clamps and Hose-Fittings

Inside Hose Diameter	Outside Diameter of Hose and Extended Inside Diameter of Clamps				Length of Fitting for Lap of Hose
	Single-ply	Two-ply	Three-ply	Four-ply	
3/16	7/16	½	9/16	⅝	1
¼	½	9/16	⅝	11/16	1
5/16	9/16	⅝	11/16	¾	1
⅜	⅝	11/16	¾	13/16	1
½	¾	13/16	⅞	15/16	1
⅝	1	1 1/16	1⅛	1 3/16	1
1	1¼	1 5/16	1⅜	1 7/16	1¼
1¼	1½	1 9/16	1⅝	1 11/16	1½
1½	1¾	1 13/16	1⅞	1 15/16	1¼
1¾	2	2 1/16	2⅛	2 3/16	1¼
2	2¼	2 5/16	2⅜	2 7/16	1¼
2¼	2½	2 9/16	2⅝	2 11/16	1¼
2½	2¾	2 13/16	2⅞	2 15/16	1½
3	3¼	3 5/16	3⅜	3 7/16	1½

Limits on inside diameter of hose ± 1/64. Limits on thickness of hose (not measured at lap) ± 1/64. All dimensions in inches.



Three-quarter and cantilever test and pressure block

"The above recommendation covering speed ratings has been previously submitted several times and approved by the Standards Committee. The recommendation submitted on electric vehicle mileage ratings has been modified materially from that previously submitted and referred back to the division of the society. Both definitions are in the simplest possible form, but it was found impossible to secure any unanimity of opinion among the vehicle manufacturers.

"This report has been submitted for consideration to ten members of the Electric Vehicle Division, which consists of nineteen members (including chairman of the Standards Committee), of whom ten have voted affirmatively, none negatively and none have refrained from voting."

The engine and transmission division reported progress with the collection of data on motor performance characteristics. They said that there had been encouraging results of inquiry as to the possibility of standardizing poppet valves in some sizes, hand starting cranks and V belts for fans. They stated, however, that they had found the suggested standard base for water pump mounting would be impracticable and disadvantageous.

A report from the research division, including a suggested form for testing cars for gasoline economy, was discussed and will be brought forward again at some future date, and brief progress reports were also put in by the chairman of the foreign co-operation division and the lock washer division.

Proposed Eighth Report of Iron and Steel Division

Revision of "Notes and Instructions"

IT is recommended that the text of the seventh report of the iron and steel division be revised by deleting all that occurs on page 160 of the June, 1915, Bulletin, before the title, Carbon Steels, and inserting the following:

Regarding Specifications, and Notes and Instructions

The notes and instructions following the specifications given below are not to be considered in any way a part of these specifications. They are added solely for the information of the user of the steels and the guidance of the purchaser in the selection of proper materials for his different purposes. They should not be incorporated in the specifications when ordering steel, except under such conditions as are noted in the body of the specifications themselves.

The compositions listed below include practically all the

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steel materials which the division believes are necessary for the production of the great majority of automobile parts, in grades which have been found commercially available and technically adequate to perform the service encountered in these parts. In cases where very special duty or exceptional quality is demanded, grades containing less phosphorus and sulphur and narrower ranges of carbon and manganese are available, but these special grades should be made the subject of special agreement between buyer and seller.

Specifications for Automobile Steels

Basis of Purchase

1. Automobile steels shall be purchased on the basis of the requirements as to chemical compositions specified in sections 5, 6 and 7. It is not recommended that tension and bend tests shall be specified for the material as shipped, except when physical requirements are specified. When steel is bought on physical properties, requirements as to carbon shall be omitted.

Steel Castings

2. The standard specification No. 1235 for steel castings, adopted by the Society of Automobile Engineers, shall cover the purchase of automobile steel castings.

Manufacture

Process

3. The steels shall be made by the Bessemer, open-hearth, crucible, electric, or any other process approved or specified by the purchaser.

Discard

4. A sufficient discard shall be made from each ingot to secure freedom from injurious piping and undue segregation.

Chemical Properties and Tests

5. The steel shall conform to the requirements as to chemical composition specified in the appended lists of carbon, nickel, nickel-chromium, chromium, chromium-vanadium, and silico-manganese steel.

Ladle Analyses

6. An analysis shall be made by the manufacturer from a test ingot taken during the pouring of each melt, a copy of which shall be given to the purchaser or his representative. This analysis shall conform to the requirements specified in the table of compositions. Drillings for analysis shall be taken not less than ¼ in. beneath the surface of the test ingot and in as sound metal as possible.

Check Analyses

7. (a) Unless otherwise specified, specimens from the original product shall be submitted for sampling by the chemical laboratory. Where cuttings are acceptable, these must be taken dry, must be thin and small, free from foreign matter and discoloration.

(b) Analyses may be made by the purchaser and shall conform to the requirements specified in the tables.

(c) Drillings for analyses of bars, billets or other regular shapes shall be taken parallel to the axis, at any point midway between the center and surface.

(d) Drillings for analyses may be taken from broken tension or bend test specimens, if physical requirements are specified.

(e) Drillings or cuttings for analyses of irregularly shaped pieces for which no physical requirements are specified, shall be taken from both the thickest and thinnest sections.

(f) Wire, tubing, sheets and rods less than 1¼ in. thick shall be sampled through or across the entire section.

(g) Surface drillings shall be discarded.

Physical Properties and Tests

Physical Properties

8. If physical requirements are specified, the following sections (9 to 13) shall form a part of the modified specifications.

9. The yield point, where specified, shall be determined by the drop of the beam of the testing machine.

10. The elastic limit, where specified, shall be determined by means of an extensometer.

11. The bend test shall be made cold.

12. (a) Tension and bend test specimens shall be taken from the rolled or forged material; except that in the case of irregularly shaped forgings, they may be taken from a full-size prolongation. Specimens shall not be annealed or otherwise treated, except as specified in paragraph (b).

(b) Tension or bend test specimens for material which is to be annealed or otherwise treated before use shall be cut, for rolled material, from properly annealed or similarly treated short lengths of the full section of the piece, and for forged material from the treated forgings.

(*Continued on page* 49)

New Six-Cylinder Lozier for $1,875

Larger Six Price $475 Lower—Four-Cylinder Model Now Only $1,595—New Six Motor 3½ by 5¼

NEW YORK CITY, Jan. 4—Lozier show announcements include the introduction of a new seven-passenger six to sell at $1,875, the reduction of the larger six from $3,250 to $2,775, and the reduction of the four from $2,100 to $1,595.

The new model is rated at 50 hp. and is equipped with a 3½ by 5¼ in. L-head block motor with the crankcase integral with the upper half of the motor. Starting, lighting and ignition are by a two-unit Gray & Davis system, and a Stewart vacuum feed system is used. The crankshaft is mounted on three bearings; crank, cam and connecting-rod bearings are nickel babbitt. The timing gears are helical and the camshaft is drop-forged. Cooling is by centrifugal pump. The multiple-disk clutch and three-speed gearset are in unit with the motor. Semi-elliptic springs are used in front and platform in the rear, and the rear axle is a floating with spiral bevel drive. The wheelbase is 120 in. and tires are 36 by 4½.

The new Lozier six-cylinder car for $1,875

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Convertible and Permanent Touring Tops Highly Developed

Removable Glass Sides, Permanent Top Designs and Quickly Demountable Convertible Types Give All-Season Service and Provide Two Cars for the Price of One

Left—Permanent top design which allows of clear opening all the way around, giving the same results as the summer touring top except that it cannot be lowered

Right — Small roadster with convertible coupé top which can be placed on the roadster body by removing the summer top. This gives an ideal all-year-around design suitable for any kind of weather and makes a good physician's car

WINTER and summer have different sets of conditions which must be met by the body manufacturer, and it has been general practice for the owner of a high-priced chassis to have at least two bodies which can be mounted upon the chassis to provide against these requirements.

To bring the winter and summer body arrangement into the reach of the average car owner has been a feat which it would have been impossible to accomplish without the convertible body idea. Inaugurated at the show a year ago, the convertible touring car-sedan idea has spread rapidly and now many of the manufacturers in the field of cars selling for anywhere between $500 and $2,000 are providing bodies which have a removable top that can be put away for the summer, leaving the car in the same form as the ordinary touring design. Some of the interesting types of these cars which are now on exhibition are shown by Kissel, Hupmobile, Briscoe, Saxon, Marion, Empire and Dodge. There are others also who are manufacturing bodies of this type and all claim that the demand this season for the convertible design is up to their greatest expectations.

When the Winter body is in place the car resembles a high grade sedan; it is comfortable in the coldest of weather and the glass area is so large that the view of the occupants is not cut off to any appreciable extent. With the regulation top and side curtains the car cannot be kept as warm and, owing to the necessity for providing a large amount of cloth or other fabric between the windows in the side curtains, the view is not very good when these side curtains are in place. The convertible design provides a car with practically all glass sides, and one which if desired could be toured in with perfect comfort during the summer months.

An Optional Body Type

With the winter top removed the ordinary touring body is left. The summer top is put in position and the summer windshield put into place. To all intents and purposes this leaves the ordinary stock touring car, which does not differ in any respect from the car which the purchaser would have possessed if he had not purchased the convertible design.

In fitting these tops to the touring body the top irons, which ordinarily hold the summer top in position, act as the main supports. The touring bodies are so shaped that they

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conform exactly to the line of the removable sedan top, and when the latter is in position it should only be possible to detect the line of juncture between the convertible top and body by very close inspection.

The sedan effect of the convertible body is carried out by having the glass front a unit with the top, the supports for the ordinary summer windshield acting as the forward supports for the convertible sedan body when it is in place, so that in fitting the closed top the windshield and summer top are first removed and then the top is slipped down into the fastenings, which are made rigid enough to clamp the closed top tightly into place.

Roadsters also Fitted

The use of the all-season top is not confined to the touring cars. There are many two-passenger roadsters which are now provided with this extra fitting if so desired. The prices for these convertible bodies run as low as $455, at which price the Saxon is furnishing a two-passenger car fully equipped with a convertible design known as the all-winter top. This top is easily removed and really transforms the roadster into a coupelet. The price of $455 includes both tops, the standard roadster top being a part of the regular equipment whether the all-winter design is purchased or not. For physicians, salesmen, collectors and others who are compelled to be outdoors in all kinds of weather a car of this type should be ideal, and it is a fact that exhibitors at the Palace show have found that the listing of bodies of this type noticeably increase their sales.

Tops for All Seasons in Vogue

There is a growing class of motorists that desires to travel with a top on the car both winter and summer. To suit these the permanent top design, known as the touring-sedan, is proving to be very popular. There are glass sides on this type of car which are lowered directly into the sides of the body when it is desired to have a top which in general appearance conforms quite closely to the up-to-date one-person design. This top does not take away from the side view any more than does the ordinary summer touring top, but owing to the fact that it is permanent and no provision need be made for raising or lowering it, it is rigid and at the same time is lighter, through the elimination of the top bows.

When the glass sides are up on a design of this kind a complete sedan is provided which is just as windproof and weatherproof in every particular as the permanent sedan with the added advantage of the fact that the windows can be lowered in a few seconds, providing the open air touring body much desired during the summer months. The windshield of the cars of this class are such that on the road it would be difficult to distinguish a touring-sedan from the ordinary touring car with the top up.

Permanent Tops Are Popular

Another feature of the touring-sedan which makes it somewhat more luxurious than the ordinary touring car with the top up is that the sedan-top can be lined with upholstery that matches the interior of the body. It is also possible to provide electric lights in the upper rear corners of the body so that when the glass sides are up all the luxury of the full-town body is provided.

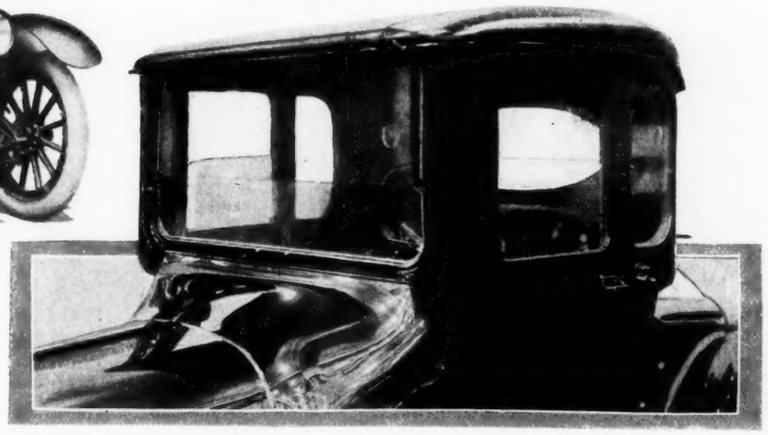
One of the points brought up in connection with the convertible designs is that the paint work of the winter top is apt to be bright and new while the lower part of the body has lost its bright finish, due to continuous use. In order to overcome this objection the convertible tops are given a dull black finish, much on the order of black leather. This black color blends very well with bodies which have lost their original paint lustre.

In making the convertible top absolutely waterproof it is necessary to take great care in the connecting joint lines between the touring body and the removable upper section. Rubber insert washers, which act as continuous weatherstrips, are placed around the entire top and also around the windows to prevent leakage. The irons for the summer top and for the windshield are made heavier than ordinarily for the purpose of taking the added weight due to the use of the convertible top.

A suggestion which has been made in connection with the use of the closed top on the convertible body is that it permits of the employment of a Victoria top for summer if so desired. This is a fine appearing top which acts admirably as a sunshade and at the same time permits a maximum view range from the tonneau seat. It is, of course, not a bad-weather top, but since the convertible design is so readily fitted in case of impending bad weather the Victoria top in connection with it furnishes an ideal combination.

Convertible roadster coupé which gives a luxurious town body for winter or city use and an open roadster for summer work when it is desired to tour without a top. The summer top and windshield are fitted to this body when the coupé is removed

Lower—Quickly removable top which converts the typical open-roadster design into a convenient coupé with broadly glassed sides which do not interrupt the view as is even the case with the summer top with side curtains in position



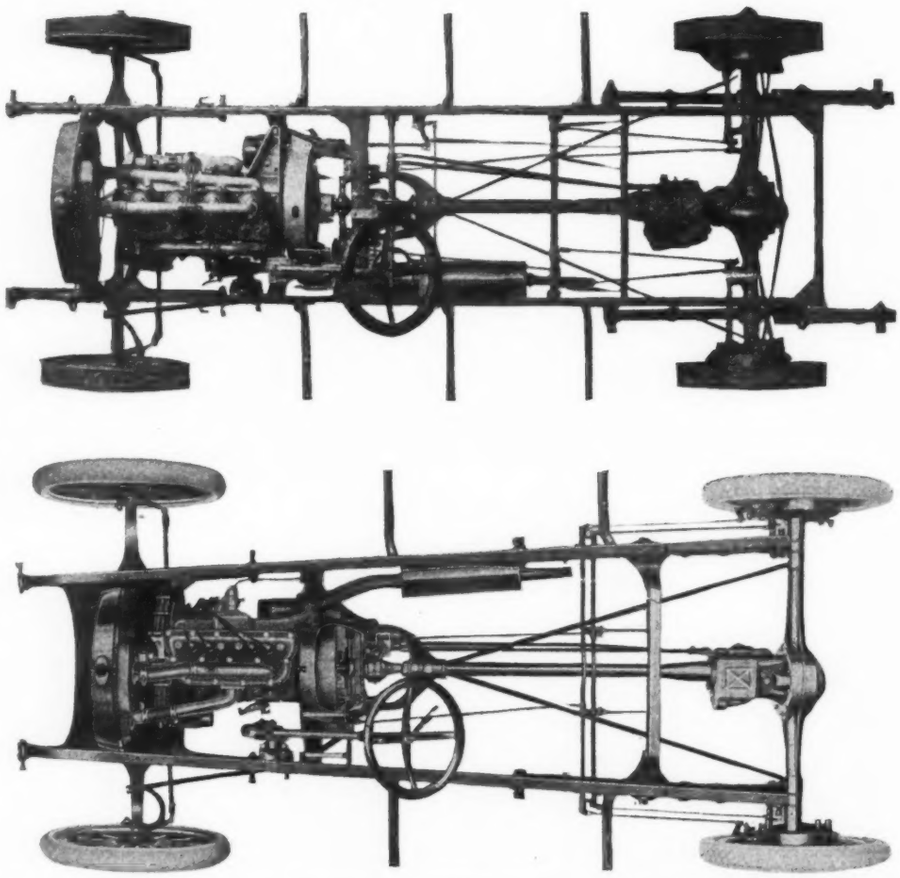
GRIDDER & SIDE GUIDE

Chassis Simplified for 1916

Elimination of Links, Rods and Arms Makes a Quieter Design of Greater Accessibility

By J. Edward Schipper

ALL the tendency toward simple motor exterior and unit construction would be incomplete unless the same trend could be traced back through the chassis design. In the development of the car simplification has been the keynote, and giant strides have been made in this direction since 1914. In fact, it may be said that up to that year development had been more in the line of increased mechancial efficiency than in simplification of detail. In order to attain better mechanical results more detail was added than taken away, and the result was that the chassis of 1914 probably reached the pinnacle in number of parts. Since that time, every tendency has been toward securing the same results with fewer parts, and this in turn has made the car lighter and given a better vehicle because this lightness is such an important factor in performance.



Contrasting the old and new Overlands, the relative simplicity of the 1916 car becomes apparent

Unit Powerplant a Factor

The first big step toward clearing the chassis lines and eliminating surplus parts came with the development of the unit powerplant. This method of construction immediately obviated the necessity for a large number of links and bars which on a plan view of the chassis make a striking difference. It must be remembered that every long link and every joint is a potential source of noise which may either develop into the rattle of looseness or the squeak due to dry rubbing contact. It is also a barrier in the way of accessibility and it is another part which requires attention from either the maker or repairman when he is working about the car. Simplification and accessibility go hand in hand. It is impossible to find an engineering job which is accessible that is not simple.

Illustrated on these pages are some good examples of where block casting and unit powerplant have had a sharp influence on the simplicity of the ultimate design. Referring to these it will be seen that the Packard twelve, for instance, is simpler than the Packard six as far as the entire chassis layout is concerned. The Cadillac eight is simpler than the four-cylinder model in chassis detail, in spite of the fact that it has double the number of cylinders, and the Overland model 75 for 1916 is a far more simple job than the Overland model for 1913. These are only a few examples selected at random, but they serve to show that the tendency toward simplification is not confined to the lower-priced or higher-priced cars, but covers the entire field.

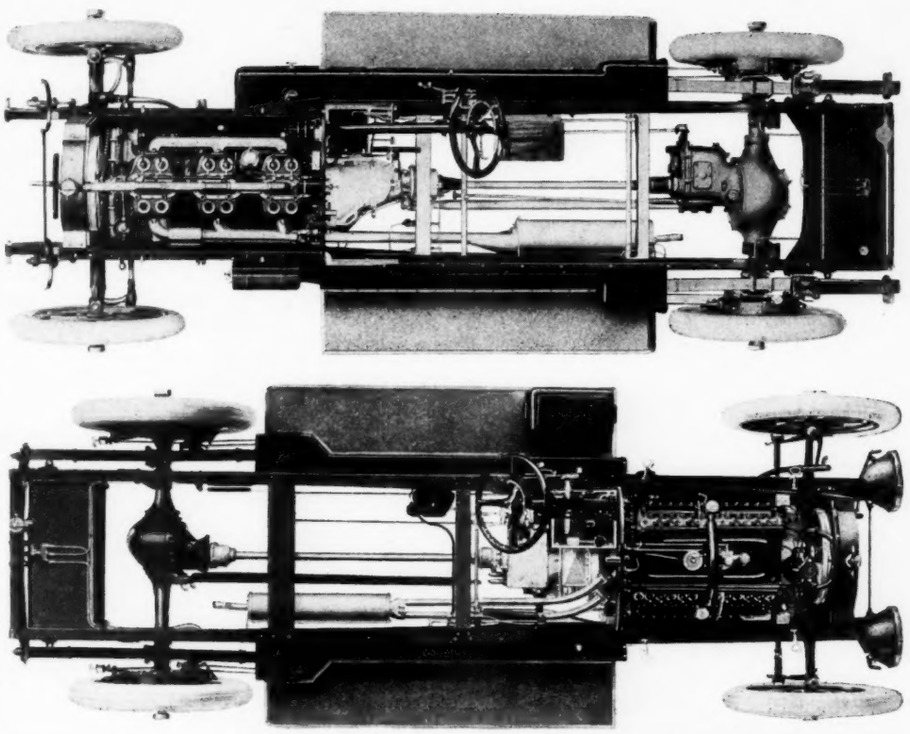
The tendency away from the amidship gearbox in favor of the unit powerplant design in which crankcase, clutch housing and gearbox are all one compact unit, means far more than merely a change in position of the gearbox. In the first place it has meant the elimination of at least one cross member of the frame, this being the pedal and lever shaft which was frequently carried across the chassis just forward of the gearbox. It has eliminated, in many instances, a universal joint which was placed between the clutch and gearset in order to take any alignment variations in the drive and, most valuable of all, it has eliminated the connecting-rods between the gearshift gate and the gearbox.

Center Control Cuts Parts

When the unit powerplant was developed it fortunately came at a time when the trend was all in favor of center control. These two features of design blend admirably. The unit gearbox is in such a position that the gear change lever can be mounted directly on the cover plate of the gearbox allowing the bottom part of the rod to extend downward and to act directly on the shifter collars. The result is that there need be no interconnection between the shifter lever

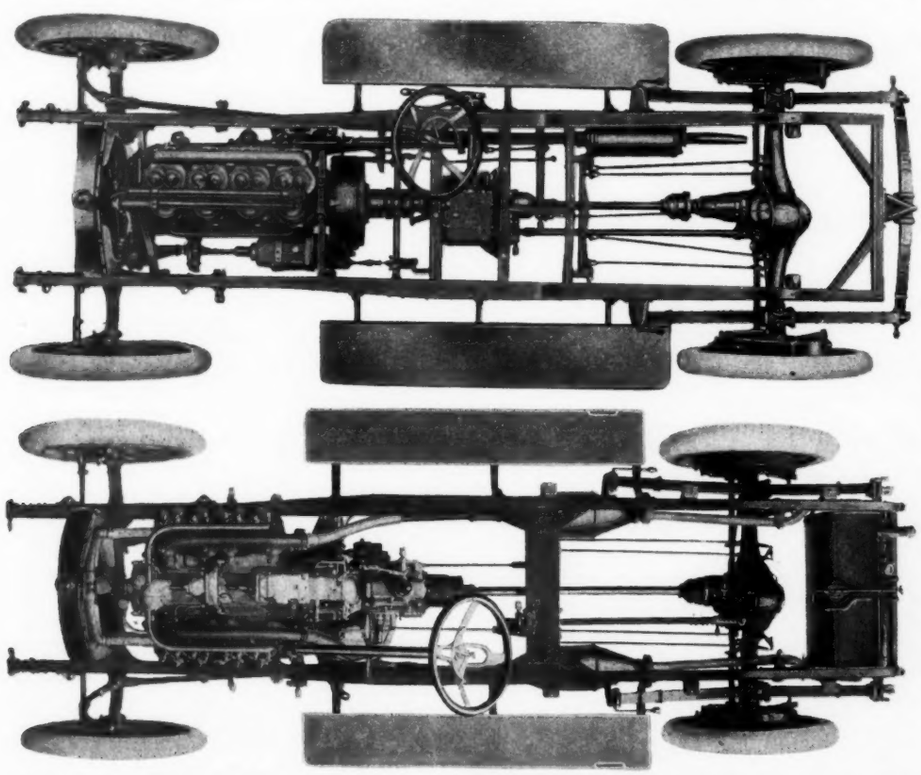
and the gearset, since the shifter rod itself can act directly on the gearbox mechanism. This eliminates five or six exterior parts which were exposed to grit and dirt. It also eliminates certain parts which in connection with the gearshift lever, were outside the gearbox and in other positions were inside. These parts had to be lubricated as they had a sliding motion in the gearcase and the result was that a large amount of dirt and grit were carried into the gearbox and became a factor which tended toward shorter life of the gears.

The up-to-date gearbox with its compact housing is gritproof. Furthermore, by the absence of disadvantageous linkage the throw of the gearshifter lever is considerably shorter, the gearbox itself being of smaller overall length, due to better design and closer spacing of the bearings; giving a relatively stiffer shaft owing to the shorter span between bearings.



Above—The Packard of 1913, and below, that of the present year. Observe the simplification resulting from adopting the unit powerplant

Eliminating the rod connections between the shifter lever and the gearbox when it is in the amidship or rear axle position has not been the only means of clearing up the masses of linkage from the chassis structure. Brake connections have afforded an opportunity for the engineer to display his ingenuity as well as in the gearshifter mechanism. Taking an average 1914 chassis there were eight parts necessary to carry the motion of the emergency lever back to the rear brake shaft. These were first, a sleeve on the cross shaft at the center of the chassis; second, a bell crank lever mounted on the sleeve; third, another bell crank lever mounted on another cross shaft; fourth, a sleeve on this cross shaft; fifth, another rod leading back to a bell crank lever on the shaft to the brake assembly; sixth, a bell crank lever on this shaft; seventh, a bearing sleeve on this shaft, and eighth, a bell crank lever to the contracting mechanism. This number has been reduced by about one-half in most of the up-to-date chassis, the result being accomplished by the use of one straight rod from the brake lever or pedal directly back to the rear brake shaft. If it is necessary to increase the leverage between the lever or pedal and the applying point of the brake, this is done by having one intermediate shaft with the desired reduction linkage.



Above—The Cadillac of 1913, and below, the eight-cylinder Cadillac. Notice the much cleaner nature of the latter

Hotchkiss Drive

Hotchkiss drive in which both propulsion and torque are taken through the rear springs has eliminated the use of radius rods, torque tubes, torque arms and the various spring connections on a large number of chassis for 1916. Hotchkiss drive is used on nearly 50 per cent of American cars, and this means that nearly half the American makes are not complicated by miscellaneous bars, rods and springs fitted for the purpose of taking driving and torque stresses.

On the rear axle the cable truss reinforcement which, with its turnbuckle adjustment was a notable feature on cars of 1914 and 1915, is noticeably absent on the 1916 cars.

Accessory Improvements Reflect Car Design

Simplification and Refinement Make Devices More Efficient While Attention to Detail and Mounting Enables the Car Designer and Owner to Blend Them Into Car Lines

TAKEN broadly, the accessory field shows that there has been a marked amount of progress in detail design during the past year. Each individual accessory has a trend toward simplification and efficiency and also toward the important matter of having the accessory blend with the car. The tendency in automobile design is to maintain a clean exterior and, hence, it is found that accessories are being designed to carry out harmoniously this idea of simple appearance. In accessories which do not fit on the car, but are of use in taking care of it, there have been improvements which tend to make the devices in question quicker in action and simpler of manipulation in the hands of the car owner. With these lines of improvement have come reductions in price, so that it can be generally said that automobile accessories are better than they were a year ago and lower in price.

Follow Car Trends

Some of the trends in accessory design have been direct reflections of the tendencies in the design of the complete vehicle. For instance, the higher speed motors have called for more efficient ignition apparatus to meet the demand of more sparks per unit of time and hotter sparks at lower speed to correspond with the ability of the up-to-date car to travel at the lowest possible speed on high gear. These two developments lead specifically to the fact that ignition apparatus on the whole this year is capable of producing a hotter ignition flame at the lowest possible rotative speeds and is also able to furnish ample ignition and positive firing in every cylinder up to speeds of as high as 3500 r.p.m.

The two developments of higher rotative maximum speed and minimum high gear traveling speed have also put the two most difficult demands possible on the carbureter, and the result is that it will be generally found that the carbureter of 1916 is capable of furnishing a better mixture at minimum speed, better acceleration throughout the speed range, and, finally, consistent carburetion at the maximum speeds. These results have been accomplished both through the better design of the gas handling features of the motor and through the efforts of the carbureter manufacturer.

The same story of better efficiency and better co-ordination between car and accessories spreads throughout the entire gamut of accessories. It is found in electric lighting and starting units, steering gears, horns, shock absorbers, tire pumps, bodies and every other accessory development, as well as in the ignition and carburetion field.

Magnetos for Twelves

The automobile show this year discloses the first efforts of the magneto manufacturer to meet the demand of the twelve-cylinder motor. The Splitdorf Dixie type, which has been in use now for a few months, ushered the magneto into the new field. At the show there are two others, the Bosch and the K-W. The new magnetos do not depart radically from previous magneto design in meeting the necessity for twelve-cylinder ignition, but there has been one important change which inaugurates a new epoch in magneto manufacture. This is the use of the offset poles in which the fields are so arranged that instead of generating two sparks for the revolution of the armature shaft, four sparks are produced. The result of this is that the magneto does not have to be driven at abnormal speeds to produce the ignition for twelve-cylinder motors. In a magneto producing but two sparks to a revolution it would be necessary to gear the magneto to three times crankshaft speed. It can be readily perceived that, with an engine rotating at 3000 r.p.m., it would be necessary in the case of a twelve to have the magneto rotating at 9000 r.p.m. This is impractical. With the offset pole and four sparks per revolution, the 1½ to 1 ratio solves the problem. Bosch has introduced this in its new type and the K-W likewise uses it.

Battery Ignition Progress

Battery ignition design has been quite well developed during the year and the show does not bring forth any surprises. Perhaps the one new feature is the Price combined lighting and ignition unit in which the generator casing houses the entire ignition unit, including breaker mechanism, distributer, coil, and condenser. Interesting applications of all the systems will be noted on the cars exhibited. The outstanding feature is that the electric system now is a built-in portion of the power plant.

Few New Carbureters

There are few new carbureters at the show, although the exhibit is entirely representative of the carbureter industry in that nearly all of the large producers, with the possible exception of Holley, are present. There are very creditable exhibits by such firms as Wheeler & Schebler, Stromberg, Rayfield, Zenith, Kingston, Carter, Stewart, Master and others.

The Stromberg is exhibiting its new model in which the auxiliary air valve is eliminated and in which the basic principle is atmospheric control as based on the Ahara patents. In this carbureter there is not a single moving part with the exception of the throttle. The design has a gasoline well for rapid acceleration. In Stromberg Model K acceleration is cared for by a secondary nozzle in which is a metering pin controlled by the auxiliary air valve.

Wheeler & Schebler shows its new Model T with the metering pin controlled by the auxiliary air valve instead of by the throttle. Rayfield has its improved model in which an acceleration feature is combined with the auxiliary air valve whereby the quick openlng of the valve injects by pumping action gasoline through the secondary nozzle. Zenith shows its conventional design for different motor types.

Sunderman has a new carbureter, the Mouse Trap, which resembles an oblong box, one-half of which is float chamber and the other half a square cross-section mixing chamber extending from end to end. In this are two nozzles of different heights which are brought into operation by a hinged air valve controlling the air entrance. The lower nozzle begins first.

There are two other unusual carbureter designs. One is the Evans, which

has a revolving drum driven from the crankshaft of the engine. This drum is relied upon to break up the fuel rather than relying on a nozzle.

The other unusual type is the Pagel, a syphon type in which there is no float chamber, the gasoline entering a mixing chamber through a single pipe leading direct from the fuel tank on the car. An air nozzle connected with the explosion chambers of the cylinders projects a current of air against the tip of the gasoline pipe, thereby syphoning the gasoline the same as in an atomizer. It is claimed that the air current created by the explosions in the air cylinders is strong enough to syphon gasoline a height of 18 ft.

Among the other carbureters shown are Juhasz, which is an expanding type with three separate nozzles, and having three separate air passages in the throttle, Shakespeare, Webber, Actus, Diamond, F. A. C., etc. In all of these no new principles are employed. They are either metering pin types, or metering pin combined with air valve control designs.

Electric Systems on Sound Basis

In starting and lighting equipment the show contained scarcely a single true novelty. This is striking testimony to the conclusion reached a few months ago, that the electrical equipment had settled down upon a sound manufacturing basis with most of its original faults and failings eliminated. Most impressive also is the decrease in the number of miscellaneous Ford starters. The big firms who entered the field during 1915 seem to have been wonderfully successful, while the lesser lights among the pioneers have dwindled away.

Great interest at the show is to be noticed as centered upon the Stewart air starter for Fords. This has been announced and on the market for several months and consists of a piston working in a circular cylinder, the whole inclosed in a small steel case that bolts to the front end of the frame, a coupling linking the starter shaft with the crankshaft. A tank, kept filled with compressed air automatically, holds enough air for some fifty starts and each start drives the motor through one revolution with such energy that it spins for three or four more. The outfit is inexpensive and easily attached.

Similarly of the electric starters for Fords, the Gray and Davis, the Disco, the North East, the Westinghouse and the Kemco, to mention just a few, are practically the same to-day as they have been for some time past. Some have detail changes tending to increase efficiency, reduce weight or cut manufacturing costs, but to the user they all appeal as simple electrical machines, easily attached and efficient in service.

There are two new models of electric Ford starter, one being the Bosch and the other the Eveready. The former is an elaborate system combining the ignition service and the starting motor is a separate unit acting on the flywheel, a special split gear ring being clamped to the latter. The Eveready is a single unit machine mounting out in front of the radiator and secured to the crankshaft by a flexible coupling. Electrically, it is a simple machine with no controls requiring any attention. The makers claim that the position chosen is the ideal for a Ford starter, as the weight being central the natural three-point balance of a Ford is not interfered with. They even arrange the battery in a thin case that goes against the front seat so that its weight shall be evenly disposed on either side of the car.

For the Eveready starter is claimed the virtue of reducing vibration, it being said that the flywheel effect of the armature spinning on the front end of the crankshaft steadies the running to a noticeable degree.

Absorbers Reflect Spring Progress

Greater confidence on the part of the shock absorber manufacturer in the spring suspension fitted with the cars is manifested this year. The Hartford Suspension Co. has given up its progressive friction type and concentrated on the continuous friction device, as the company has come to realize that the longer springs enable the car to better absorb the minor shocks. The cantilever, with its great flexibility, has been one of the factors in this development. To meet the requirements of the cantilever, there is a new set of brackets for the Sager shock absorber, which have been added to make the absorber suitable for this type.

Horns and Body Design

The development in horns is an instance of where the accessory maker has endeavored to make his product coincide with the tendency to keep the body lines clear. The Long horn, for example, is made in a new model which permits the horn to be mounted under the hood, although still operated by hand. The horn is controlled by a double Bowden wire which operates the ratchet mechanism. Klaxon horns are now made with horizontal instead of vertical drive, allowing the motor to be mounted in the casing behind the diaphragm instead of below it.

More Electric Vulcanizers

The high spot in vulcanizer design is in the use of more electric and fewer steam types. The reason for this is in the quickness with which the electric designs attain their working temperature. Shaler has a new type for garage use and there is a new Premier portable type for the owner. Both of these are characterized by simplicity and by the quickness with which they can be operated.

Single Cylinder Pumps Gain

In power tire pumps there is a marked trend toward the single cylinder design and even in these single cylinder types, the installations are more compact and smaller than ever before. An example of where compactness has been sought and accomplished is shown in the Kellogg single-cylinder job in which the small diameter, long cylinder has been replaced by a larger bored cylinder which is shorter. Rigidity is secured by the use of a double connecting-rod. Another improvement in pump design is suggested in the Stewart type which, in place of plain pistons, has now pistons which are fitted with rings.

Clocks Are Simpler

Clocks are, on the whole, more easily read and less likely to be neglected as far as winding is concerned than ever before. The Hartford company puts out an electric clock which can be run on any voltage from 2 to 110. It is made in both flush and extended models with black on white or white on black faces. Another clock known as the B-4-U is designed to fit in the center of the steering wheel and of course is always accessible.

Refinements in Speedometers

Speedometer designs are more refined in detail and have not had any radical variations during the year. Perhaps the most significant development is the universal employment of a re-set mechanism which can be employed to put the mileage of the trip odometer at any desired point. Stewart-Warner employs a small button on the face of the instrument which, when pressed, turns all the trip disks back to O. The Jones speedometers are now known as the Johns-Manville and have a wheel reset instead of a knob. The Corbin-Brown uses a large knurled wheel and Van Sicklen now has an instrument known as the Spedistimeter which is a combination speedometer and watch.

Dimmers Are Factors

In electric lights and accessories, the use of scientific dimming devices and convenient spot lights are the big points. The Corning and Guide optical methods which keep the light on the road and yet eliminate the glare, are very good examples of what is being done in this respect. The result of tilting the lamp is improved upon without the bad feature of spoiling the appearance of the car. The J. M. frosted globe with slotted front is still used by this concern and in the way of spotlights, it will be noted that these are smaller, more compact and better mounted than ever before and at the same time are selling for less money.

Salon Is an American Show

Fine Examples of Bodywork Illustrate Trend Towards Convertible Type—Cowl Instrument Boards Disappearing

WHILE broadly speaking the automobile salon at the Hotel Astor is a body show, still there are exhibited a number of polished chassis which give an insight into a field of engineering development in which price has not been the dominant factor. The combination of ultra-luxurious bodywork and engineering design unfettered by price consideration makes the Salon exhibit occupy a unique position and furnishes an exhibition which brings out the latest word in refinement of mechanical and coach design.

This year the Astor Salon is not an importers' salon as there are only five foreign chassis on the floor, and these are not of design new to the American public, Peugeot, Rolls-Royce, Lancia and the Delaunay-Belleville.

The American cars on the floor are the Singer, White, Daniels, F. R. P., Simplex-Crane, Brewster-Knight and Owen Magnetic. In addition to these there is another foreign car on the floor, the English Daimler, which exhibits a town body by Henry Labourdette of Paris. The Holbrook company, body maker of New York City, is showing a Cadillac eight chassis fitted with a Berline design, a Packard with a landaulet and a White with a landaulet body. Healy has several bodies on Locomobile chassis and Bender & Robinson are showing two special bodies on Singer chassis. The regular Singer bodies are also manufactured by Bender & Robinson.

Instrument Board Eliminated

Some of the trends in body design which will no doubt be followed in a short time by the lower-priced American stock jobs are very interesting. The absence of the instrument board is perhaps the dominant note in body trend, the line of instruments in most instances being taken from the cowlboard and placed in a neat setting at the toeboard. In addition to the clock and speedometer in the driver's compartment, the practice is growing to place another clock and speedometer in the second cowl in the tonneau, thus allowing the owner an opportunity to know the rate of the car and time of the day as well as the driver.

Convertible Bodies Are Factors

The tendency toward making the body an all-season proposition is very marked at the Salon. Some of the bodies can be transformed from a limousine into a landaulet and then into a touring car. The Healy company is showing one body on a Locomobile which is a good example of the work. It is what is known as a touring-limousine, but so neatly do the glass sides fold into the body and the pillars which support the limousine roof drop into the lines of the touring car that it is difficult to perceive either in the case of the touring or the limousine arrangement how that body could be transformed from one type to the other.

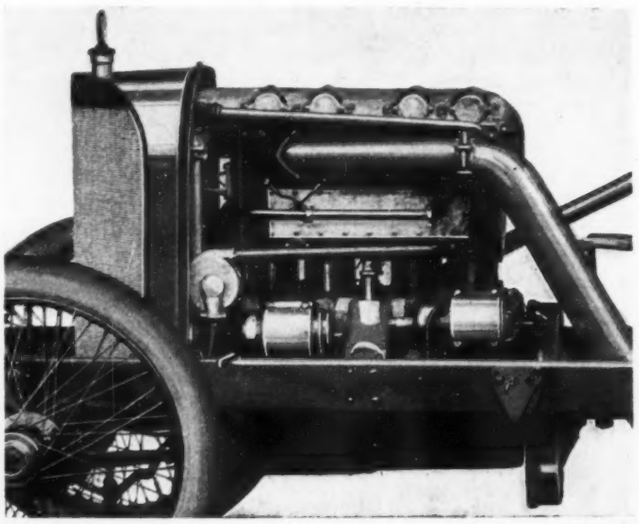
The convertible body and the toeboard instrument set are not universal, however, at the Salon, although they do represent two notable trends. For example, on the Simplex-Crane chassis, the complete cowlboard instrument set is used, and every conceivable type of instrument is arranged across this flat board before the driver. From right to left the outfit includes a voltmeter, clock, air pump, switch block, carbureter adjustment, gasoline gage, oil gage, ammeter, speedometer and odometer. This is the most elaborate cowlboard exhibited, and the line of instruments takes up every available portion of the space which is available across the entire front of the car.

Transmission Brakes Shown

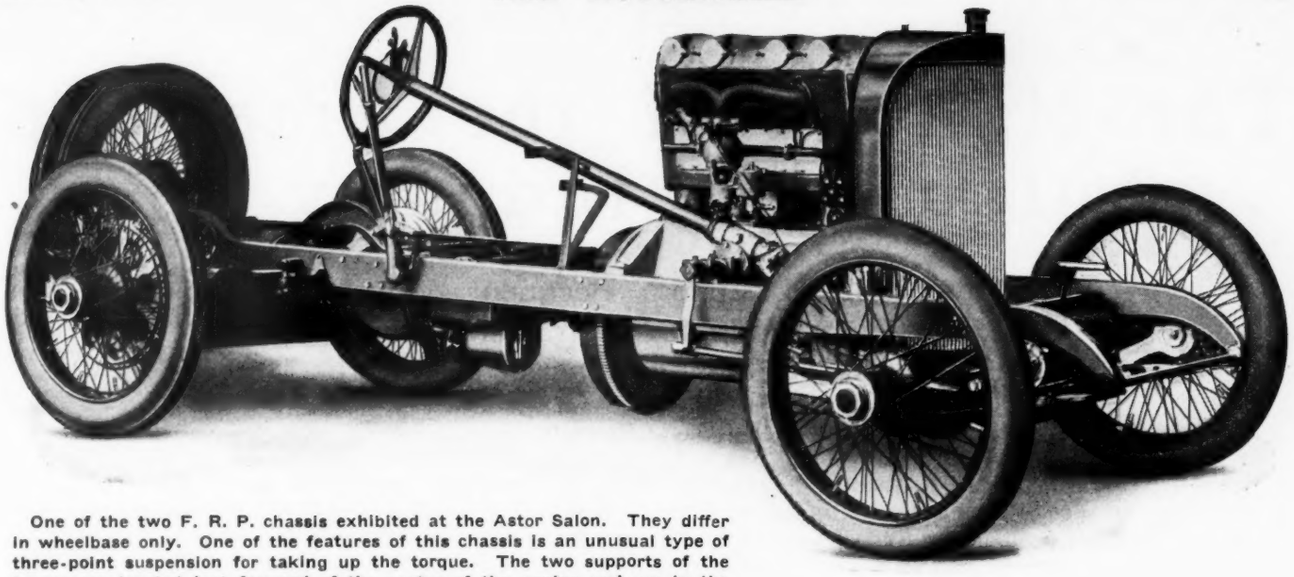
Examples of transmission brakes which are very neatly designed may be seen on some of the chassis exhibited at the Astor. Peugeot has a good example of the transmission type of brake mounted on the forward universal. It is deeply ribbed for cooling and is of great area. Taking this area into consideration with the reduction at the rear axle, there is no doubt that a highly powerful braking action is possible with this construction. The transmission brakes are not confined to the foreign cars, a good example of the installation of the transmission brake on an American chassis being on a Simplex-Crane. Another feature about the Simplex-Crane which is interesting is in the subframe motor support. This subframe starts at the forward end of the main frame and runs back parallel to the main frame member, forming really a frame within a frame. The subframe supports the motor and gives a very rigid support all the way back to the gearset and at the same time acts as an efficient transverse stiffening member to the main frame.

The chain drive chassis has not altogether disappeared from American practice. This is evidenced by the fact that the Simplex chain-drive job is shown in stripped chassis form on the floor. The chains, however, are inclosed in metal cases which permits them to be free of the danger of grit and dirt which was always the big objection to chain drive. The casing about the chain also acts as a silencer and as an oil container.

The F. R. P. chassis is exhibited in two forms, one of short and the other of longer wheelbase. The overhead valve action with the overhead camshaft is exposed, showing a cam contour and drive which is suggestive of big gas passages and high speeds. The cam lines are quite square, giving very quick valve opening and the springs for the valves are short but of heavy section for quick closure. Another interesting point on the F. R. P. chassis is the three-point suspension for the motor. The triangular layout differs from that gen-



Right side of F. R. P. motor, showing overhead valve mechanism



One of the two F. R. P. chassis exhibited at the Astor Salon. They differ in wheelbase only. One of the features of this chassis is an unusual type of three-point suspension for taking up the torque. The two supports of the layout are located just forward of the center of the engine and are in the form of flexible trunnions. The third support is at the rear of the motor

erally found in three-point systems, the two supports being located just forward of the center of the engine and are in the form of flexible trunnions. The third support is at the right rear of the motor which gives a right angle triangle layout of supporting members, with two points on the right side of the frame and one point on the left. The object of this is to absorb the immense torque of the motor which is designed for power and speed without risking the stresses which would fall upon the crankcase member and tend to throw the main bearing out of line.

Subframes Are Strong

It seems to be a distinguishing feature of the cars at the Salon that the subframe structure is extraordinarily sturdy. This is in direct opposition to the tendency to be noted at the Palace show where frame sub-structures and cross-members are if anything, lighter and more flexible than ever before. An example of heavy subframe work is given in the Peugeot stripped chassis. This is one of the 40-hp. jobs and is characterized by this heavy transverse structure which carries the gearbox and also no doubt acts as a torque-absorbing member for the stresses created by the transmission brake. The Singer chassis, which is of American design throughout, provides an interesting study in frame substructure. The F. R. P. is also an example of this and so is the Brewster-Knight. In the latter the subframe bracing is very stiff, the connections being made by heavy gusset plates to the main frame.

A Fine Cabriolet

It is in body work that the Salon has its greatest distinctiveness. A cabriolet designed by J. F. DeCausse of the Healy company is a good example of convertible work. When in the cabriolet position, the body exhibits a town car design which is the last word in luxury. The upholstery is in gray cord and the body itself is gray. In two minutes this body can be transformed into an open roadster, the pillars which support the forward end of the cabriolet top fold downward into the body, the entire top slides backward and folds into such a form that it can be incased in an envelope and the glass sides by the turn of a small crank handle slide into the sides of the body, leaving nothing but a sociable type roadster which is an exact counterpart of designs of the non-convertible type intended only for roadster use. This combination gives an all-year car which is luxurious both in its roadster and in its cabriolet form.

Another Healy body is in the form of a five-passenger sporting model. The interesting point of this is that although the front seats are not divided there is no door to the rear compartment. Accessibility for the passengers is accomplished by having a forward seat which by means of a slight push ahead instantly opens a passage from the forward compartment to the rear seats. The absence of doors in the rear gives the body great strength and lightness, the lines of the roadster and the capacity in spite of this is equal to the average touring car.

Ingenious methods for concealing the extra seats in the seven-passenger touring design are shown in the Singer bodies. These slide into the front of the compartment folding into the back of the front seats and being covered by a shutter. Folding arrangements for seats and body parts are carried out with a neatness which hardly permits of detection of the folding parts. In all of the work at the Salon, the Bender & Robinson special roadster with folding rear deck is a good example of the thoroughness in this work. When the rear compartment is folded open an upholstered seat with upholstered arm rests is provided and when closed the flat deck of the roadster conforms exactly with the ordinary lines of a two-passenger car.

Sedan Bodies Are Popular

Sedan bodies with V-shaped front, the apex being at the front end of the inclosed body, seem to be quite popular. One of these is shown on the Singer chassis, another on the White and also on the Cadillac. These give an added length to the body and add to the appearance of lowness. They are difficult, however, to maintain raintight in front and careful provision has to be made on the windshield for shedding the rain and not allowing it to work through crevices.

Victoria tops also seem to be popular on some of the touring designs. The White company is showing a victoria top on an olive-green touring car which makes a very handsome body. The Lancia victoria top on a top with no running-board gives a combination which shows the ultimate in high-class design.

Sloping windshields are not in as much evidence as they are at the Palace. The Daniels eight has a roadster in which the windshield is raked backward slightly. On the touring car, however, the straight windshield is adhered to. The Daniels landaulet is a regular stock design and is a good example of conservative design in this work. The Daniels eight is not exhibited at Grand Central Palace. It is fitted with a V-type powerplant which is made in either 3-in. bore or 3¼-in. bore with 5-in. stroke. The wheelbase is 127 in. and the tire size 34 by 4½.

The History of the American Automobile Industry—11

The Advent of Onesiphore Pecqueur, Whose Steam Automobile, Patented in 1828, Embodies Practically All Essential Features of Modern Practice Except the Motor

By David Beecroft

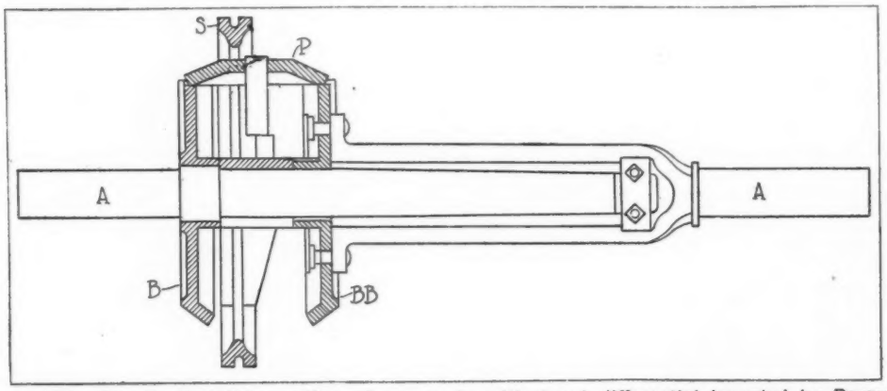
IN the early development of steam no inventor was further ahead of his times than Onesiphore Pecqueur, a very celebrated Frenchman, who in 1828 patented a steam vehicle which embodied practically all the essential features of the modern automobile with the exception of the motor. To Pecqueur should be ascribed the title of Father of the modern automobile. His patent drawings of April 25, 1828, show that he employed the accepted type of automobile steering gear as we have it to-day, Fig. 1, although each front wheel is carried in a bicycle type fork by itself and a front axle connecting the two wheels is not used. Fig. 2 shows how he combined the two front wheels by using steering arms and the cross tie rod employing also a rack-and-pinion type of steering gear.

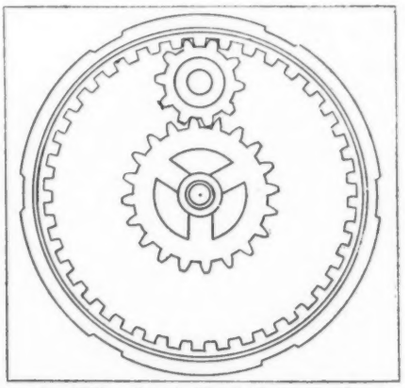
First to Use Differential

Pecqueur, in addition to being the first to patent the present-day steering gear, was also the first to use a differential or balance gear in the rear axle. Fig. 3 is a plan view of the complete Pecqueur steam vehicle and shows the differential mounted in the axle proper, and Fig. 4, a section of this axle, gives further details. Fig. 5 shows the complete details of the first modern type of differential ever employed in the automobile.

But Pecqueur went further and used a planetary gearset giving two forward speeds, the reverse not being necessary because of using a steam engine which could be reversed. Not requiring a reverse or friction clutch, his patents show a jaw or positive clutch which he used in connection with his speed-change planetary gearset.

His patent drawings show very plainly a rear axle in two parts, one forming a sort of sleeve over the other, and each carrying a bevel gear with a spider carrying a bevel pinion and a sprocket for a chain, practically identical with the Duryea, Knox and other constructions in common use at the end of the nineteenth century. He employed the fixed front axle with steering knuckles and short spindles now universally used, a device which was patented by Rudolph Ackerman, an Englishman, in 1818, for use on horse vehicles. His engine was a type of rotary and evidently not a very practical affair, which probably accounts for nothing more being heard of his device. One of the advantages of the Ackerman steering as exploited in those early days was "lessened danger of upsetting." It was argued that a continuous axle and king bolt gave but one point of support for the front end of the vehicle, whereas the Ackerman device constantly maintained a support at each front corner. This argument would be more valuable if uneven roads did not demand a considerable flexibility of structure, which must be supplied by springs, three-point support or in some equivalent manner.





Left—Fig. 5.—Complete section of rear axle with bevel differential invented by Pecqueur in 1828. One-half of the axle A carries the bevel gear B; and on the other half of the axle is carried the other bevel gear BB. One of the pinions P is shown, as is the sprocket S for single chain drive. Instead of dividing the two halves of the axle as we do to-day, Pecqueur mads one half in the form of a sleeve or tube within which he carried the inner end of the other half

Right—Fig. 6.—Type of two-speed planetary gearset employed by Pecqueur on his steam vehicle of 1828. To change the speed of the engine with relation to the rear wheel the driver pushed a small handle which regulated the planetary gearset, which operates in the conventional planetary gear manner as in use at present

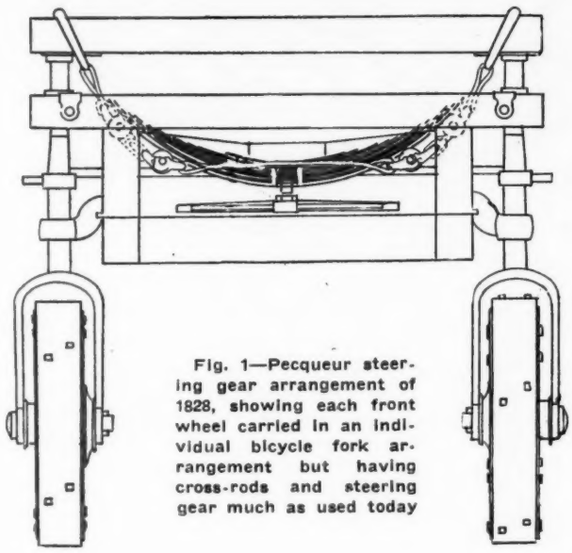


Fig. 1—Pecqueur steering gear arrangement of 1828, showing each front wheel carried in an individual bicycle fork arrangement but having cross-rods and steering gear much as used today

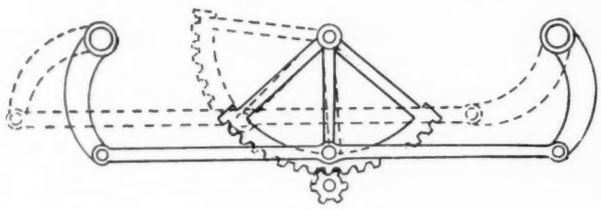


Fig. 2—Diagram of rack-and-pinion type of steering gear used on Pecqueur steam cars in 1828, showing the use of steering arms and cross-tie rod, the same as employed in steering at the present time

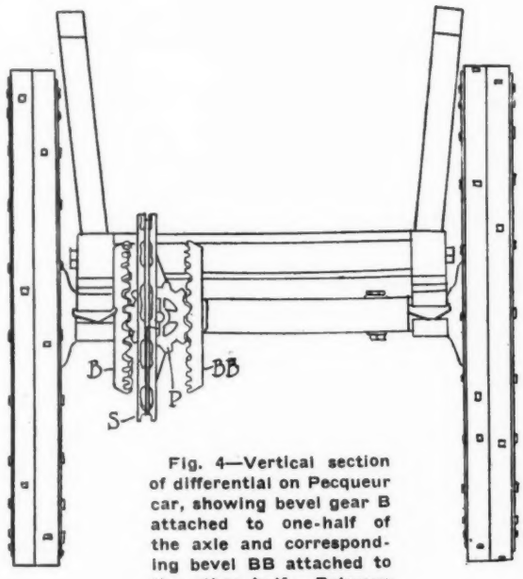


Fig. 4—Vertical section of differential on Pecqueur car, showing bevel gear B attached to one-half of the axle and corresponding bevel BB attached to the other half. Between them is mounted one of the balance pinions P and outside is the sprocket S for chain drive

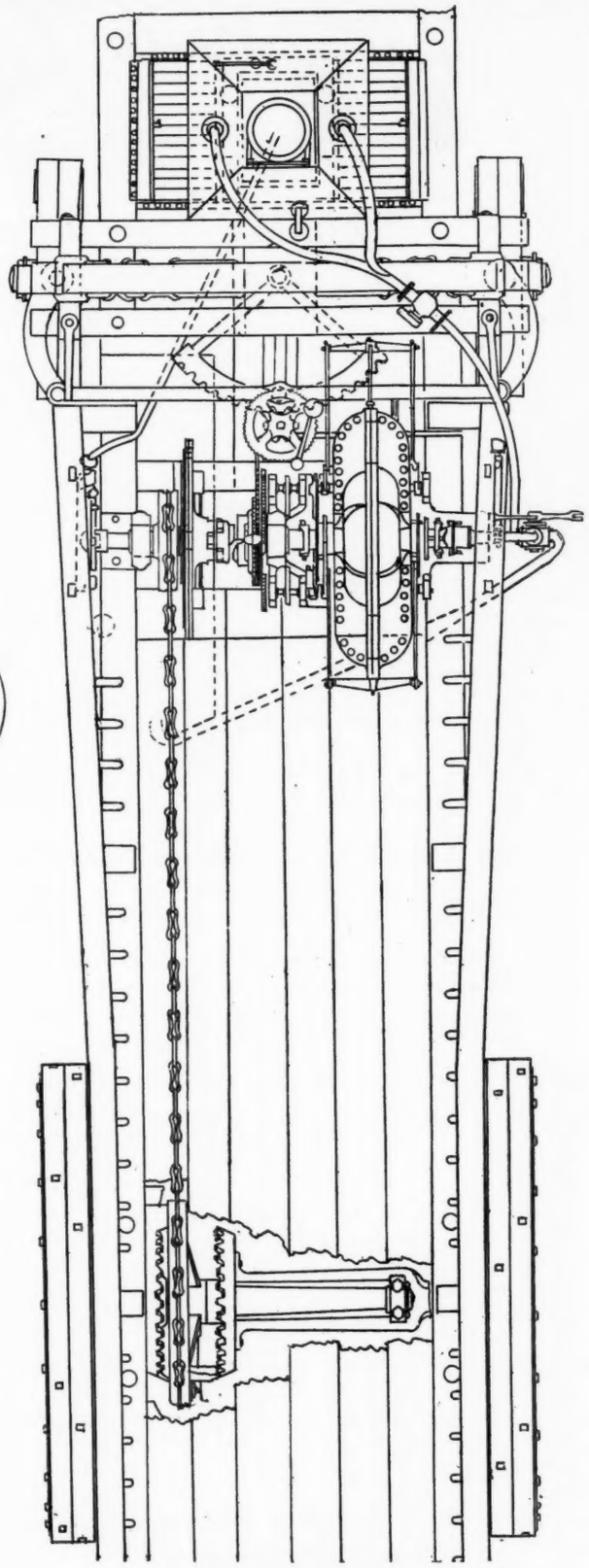


Fig. 3—Plan view of Pecqueur steam car, 1828, which merits being known as the father of the modern automobile in that it employed for the first time the modern steering gear, a two-speed planetary gearset, and a divided rear axle carrying a modern type of differential

The Rostrum

Chipped Gears Cause Differential Knock

EDITOR THE AUTOMOBILE:—I noticed a knock in the differential of my car which is a 1911 model Oakland 33 and after washing out the housing noticed a piece of steel lodged between the teeth of the large bevel gear. Last week a similar piece produced a knock. On observing the large bevel gears through the pipe-plug hole, I cannot detect the wear, but am unable to examine the small pinion without disassembling the housing. End play in the axle is not over 1/32 in. as tested by jacking up the wheels. Heretofore I lubricated the differential with steam cylinder oil, 600 W. and am now using light motor oil. The car runs all right and I would like to know whether I should continue using it or have the differential housing disassembled?

Dubuque, Iowa. W. E. C.

—The differential housing should be disassembled immediately for the purpose of determining what is giving way in the gears.

From the explanation you give it would seem that the gears had become chipped which will result very often from careless handling of the car, that is, by dropping in the clutch when the motor is speeded or by applying the brakes heavily. It can also be produced by mental fatigue due to long service.

Wiring Diagrams for Installing Ammeters

Editor THE AUTOMOBILE:—Will you please publish a wiring diagram for installing ammeters on models B-55 and C-55 Buick cars so as to show the discharge when the starter and lights are in use? Also, the rate of charge from the generator to the battery?

Barre, Vt. H. & M.

—The wiring diagrams for installing ammeters are furnished herewith, the diagram for Buick model B-55 being shown in Fig. 2 and for C-55 in Fig. 1. The rate of charge from the generator to the battery will depend entirely on the speed at which the car is operated, but it should not exceed 18 amp.

Second Speed Gear Slips Engagement

Editor THE AUTOMOBILE:—What would be the cause of the second speed gear slipping out when pulling up a hill. It is a Lozier type 82. I have deepened the notch in the shifter rod and also tightened the plunger spring, but without success.

Montreal, Que. W. O. G.

—It is probable that the second speed plunger has become worn and needs replacing and it may also be that the spring has become weakened and needs to be replaced with a new extra heavy spring.

Installing Ammeter on Hudson 6-40

Editor THE AUTOMOBILE:—Please publish directions for installing an ammeter on a 1914 Hudson model 6-40. What size wire should be used?

Lancaster, N. H. H. M. M.

—There are two terminals on the side of the generator, one immediately above the other. From the upper side of these two terminals a wire leads to the ignition and lighting switch and from the lower one a heavy cable leads to the storage battery. Immediately beneath the terminals is a brass strip forming an electrical connection between the two. All current going into the storage battery and all current coming out of it, with the exception, of course, of the cranking current, passes through this brass strip.

To connect an ammeter in the circuit, therefore, this brass strip may be removed or simply severed, using a hack-saw blade for the purpose, and the ammeter is then hooked up with the positive side connected to the upper terminal and the negative side connected to the lower terminal. No. 10 wire should be used.

Carbureter and Line Need Cleaning

Editor THE AUTOMOBILE:—I have a six-cylinder Albatross motor radial type with Remy magneto and Schebler Model D carbureter. When I prime the motor it gives about six revolutions and then stalls. The carbureter is new and the spark seems to be all right as it runs when I prime it.

Kindly advise me what your opinion is. Before starting I open the needle valve about two turns and open throttle about half.

Cleveland, Ohio. L. M.

—Evidently there is a stoppage somewhere, either in the tank or in the line between the tank and the carbureter or in the carbureter itself.

If the carbureter is taken off and thoroughly cleaned out and the tank and line are cleaned out, you should have no further trouble, as there is unquestionably dirt or foreign substance somewhere between the gasoline tank and the carbureter or in the carbureter in the nozzle, preventing same feeding properly.

Wants 1911 Regal Instruction Book

Editor THE AUTOMOBILE:—I would like to inquire through the columns of the Rostrum whether any of your readers has a copy of the instruction book issued by the Regal Motor Car Co., for its 1911 torpedo roadster, for which he has no further use?

I endeavored to obtain this book from the Regal Motor Car Co., but was informed that it was out of print and that they did not intend to reproduce the same. I would be glad to pay any reasonable price for the book.

New York City. P. F. S.

Steam Turbines Impractical for Cars

Editor THE AUTOMOBILE:—In THE AUTOMOBILE for Dec. 9, S. T. asks the question, "Could a steam turbine be used in the Stanley steam car to furnish the motive power? If not, why?"; and you reply, "No, because it has not so far been possible to make a steam turbine in small sizes." I beg to differ with you on this point.

To my certain knowledge steam turbines are made in very small sizes by several manufacturers and are used for a variety of light power work such as driving exhaust fans, blowers, cream separators, etc. The reason that a turbine is not a practical drive for the Stanley or any other steam-

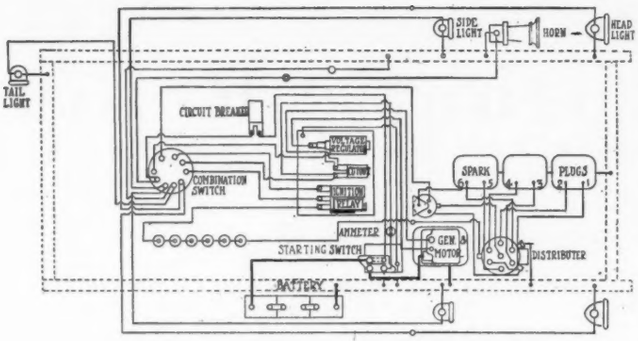


Fig. 1—Wiring an ammeter on a Buick C-55

propelled vehicle is because it has the inherent defect of possessing almost no starting torque. Steamships would be unable to use turbines but for the fact that there exists a large amount of slippage between the propeller blades and the water when starting slowly, and consequently very little load comes on the turbine till a high enough speed is attained to create sufficient friction against the propeller thrust to move the boat through the water. By this time the turbine has acquired momentum and is enabled to continue merrily on its way.

Newark, Del. R. R. W.

Must Keep Battery on Line

Editor THE AUTOMOBILE:—Will you please advise us what effect it has on a Delco generator to run a car with the storage battery removed, providing the wires are taped so that they are unable to ground?

Oneida, N. Y. O. M. C. Co.

—On none of the apparatus produced to date should a car be driven with the storage battery off the line. With the battery off the line the voltage of the generator rises to a very high limit so that it will burn out the headlights and also have an injurious effect on the ignition.

Replies to Hartford's Gnome Criticism

Editor THE AUTOMOBILE:—I noticed in THE AUTOMOBILE for Nov. 11 a criticism of an article on the Gnome rotary cylinder aeroplane engine. In this article Mr. Hartford says that the engine in question is also a reciprocating motor in that the pistons reciprocate in the cylinders. So far he is right, but he has failed to analyze further. The relative movement of the pistons and the cylinders is one of reciprocation, but the actual movement is rotary around a given center.

The cylinders revolve uniformly around the center of the crankshaft. The pistons revolve around the center of the crankpin. Owing to the design of the connecting-rods in the Gnome motor, the pistons do not revolve with a uniform speed exactly, but this difficulty has been overcome.

Mr. Hartford has fallen into the error of not appreciating the difference between relative and actual motion.

One pound of weight at 1 ft. from the center revolving at 1100 r.p.m., produces a centrifugal pressure of 412.6 lb.

San Francisco, Cal. A. F. B.

Information on Fuel Feed Systems

Editor THE AUTOMOBILE:—Will you kindly inform me of the relative merits of the several types of gasoline feed? So far as I know there are three types: gravity, vacuum and force feed, by air pressure. Of whom may I obtain literature on vacuum feed? I have air pressure feed and am always uneasy about leaks developing. Can one feel more secure with other types, or is he warranted in feeling greater security?

Norfolk, Va. M. E. R.

—Gravity feed, though usually efficient in level districts, sometimes fails to give best results when ascending steep grades. Even if entirely efficient, gravity feed requires location of the main gasoline tank either in the cowl or under the front seat, locations both dangerous and inconvenient.

Pressure feed requires an elaborate system of tubing and pressure pump, and needs constant attention on the part of the driver. Leaks are frequent. Its construction permits carrying the gasoline tank in the rear where it belongs, while at the same time forces the gasoline to the carbureter faster than needed, resulting in waste because of unconsumed gas.

Vacuum feed permits carrying the main gasoline tank in the right place, that is, in the rear, and carries gasoline unfailingly to the carbureter, without attention. A saving of gasoline consumption of from 10 to 12 per cent is shown over pressure feed, although no saving in fuel consumption is shown over gravity feed.

Proper Firing Time on 1911 Elmore

Editor THE AUTOMOBILE:—I have a 1911 Elmore 30 touring car on which I broke the timer arm. I would greatly appreciate it if you could send me instructions to time the ignition on this particular motor. It is equipped with an Atwater Kent system. The main trouble which I have had is to find the position of the distributer and piston at the proper firing time.

Cortland, N. Y. R. E. A.

—The spark in No. 1 cylinder should occur when the piston is between compression and power strokes.

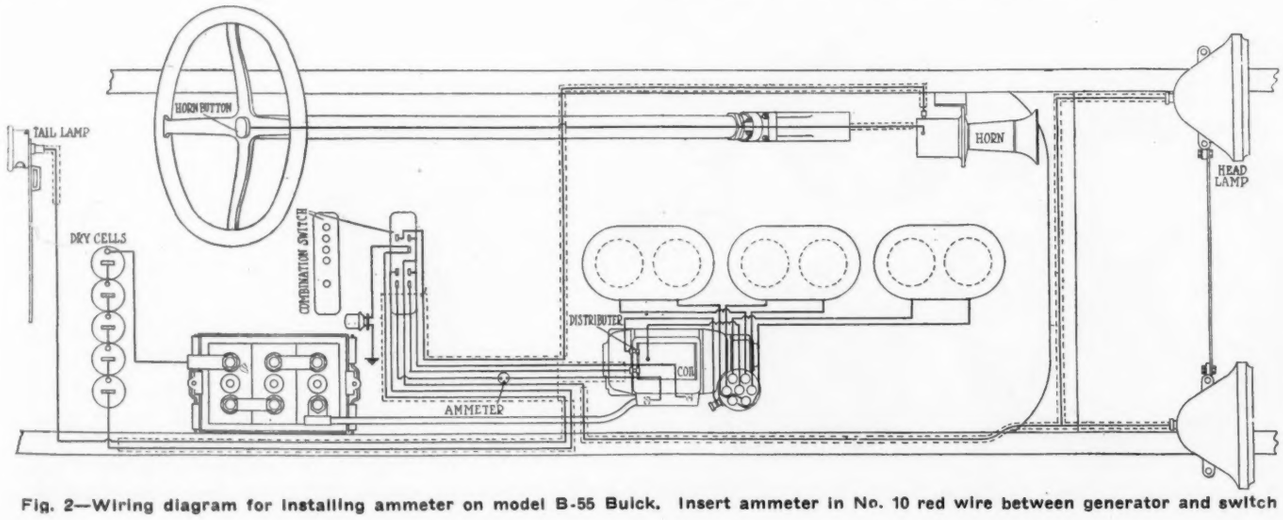


Fig. 2—Wiring diagram for installing ammeter on model B-55 Buick. Insert ammeter in No. 10 red wire between generator and switch

Bakelite—A Synthetic Resin

Formed by a Chemical Reaction Between Carbolic Acid and Formaldehyde—Used as an Insulator for Electric Starting, Lighting and Ignition Systems

ONE of the most noteworthy chemical achievements of recent years has been the work of the well-known chemist, Dr. L. H. Baekeland, in the line of phenolic condensation products which has resulted in giving to the world an entirely new and useful synthetic product, now familiarly known as Bakelite—or sometimes described by its more formidable chemical name of oxy-benzyl-methylen-glycol-anhydrite.

A Commercial Success

To the lay mind it is somewhat puzzling that two strong-smelling liquid substances—carbolic acid and formaldehyde—can be made to unite chemically with each other so as to produce a solid, transparent, amber-like substance, absolutely without taste or odor, and possessing entirely new chemical and physical characteristics. Yet this is exactly what is accomplished in the manufacture of Bakelite. In chemical products of this kind there is usually a wide gap between the laboratory stage and the final commercialization of same—but in the case of Bakelite it is an interesting fact that its commercial introduction met with almost instantaneous success, and the material is now being successfully used in a wide range of varying applications.

Bakelite in its pure form is a transparent, amber-like substance of marked chemical inertness. Physically, it is heat-resisting, mechanically strong, a high dielectric, impervious to most acids, steam and oils, and cannot be dissolved by any known solvents. In this form it is used for pipe stems, parasol handles, fountain pens, jewelry and similar applications.

A Good Insulator

For electrical insulation the pure Bakelite gum or resin is incorporated with various filling ingredients which give it strength, toughness, and other desirable qualities. Its largest, and perhaps most interesting application, is in the line of electrical insulation, where it seems indeed to have filled the proverbial long felt want and is now employed with notable successes in the electrical industry. It seems to have been particularly successful as applied to automobile ignition work. Bakelite does not burn or soften with heat like hard rubber or the shellac compositions; neither does it deteriorate with age or suffer injury from oils or moisture, which makes it peculiarly suitable for distributer blocks and other parts of electric starting, lighting and ignition systems. A large proportion of the leading lighting and ignition systems now use Bakelite insulation because ignition engineers must provide a dependable system, and dependability is largely a matter of high-grade insulation which is proof against heat and moisture.

Good examples of Bakelite used as insulation and for other useful purposes in automobile design

Aside from strictly electrical applications, Bakelite is being successfully used on automobiles for many purely mechanical applications, such as radiator and gasoline tank caps, steering wheels, door strips, etc. And perhaps in no other use has it justified itself more fully than in the molding of delicate instrument covers, where extreme accuracy of dimensions, fine finish, permanency of color and chemical stability are of primary importance.

The Bakelite molding process is simple and very interesting. Steam-heated hydraulic presses are usually used for this purpose, the molding temperature being approximately 350 deg. Fahr. (120 lb. steam) and the hydraulic pressure from 1500 to 2000 lb. per square inch of mold surface. Hardened steel dies are necessary to insure the best results. The molding material is pre-

(*Continued on page* 50)

The Automobile

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New York's Sixteenth Show

THE sixteenth annual New York automobile show is unique in that it can be called the freakless show, a show without a single novelty-row candidate in the sense we have annually studied such during the past sixteen years. Every car in the show is a full-grown vehicle, a thought-out machine and not a sensation creator. In the accessory division the same freakless program prevails, in fact, freakiness is not present; it is not a symptom much less a factor in the atmosphere. For the time at least the creator of some pet hobby that an inventor has ridden to death, is not in manufacturing favor. To-day you walk through the four floors of the show, look over the 326 chassis and cars and glance at the hundreds of accessory exhibits and the dominating influence is one of feasibility, of practicability, of accomplishment.

For a new industry to discard entirely its sensationalism in less than a score of years, in approximately one-half a generation, is an accomplishment that few industries can boast of. It is but a score of years since America witnessed the practical birth of the automobile in the Times-Herald-Chicago race, and yet in that brief span much of the story of evolution has been written.

The present show demonstrates the impossibility of any one feature of construction stampeding the industry. The days of stampedes may return but the industry has emerged from a strenuous two-year test with eights and twelves, as the major stimulants to stampeding, and yet the spirit of developing along varied lines is stronger than it was a year ago. The makers are more busy in improving the general chassis and body rather than warring with one another for supremacy in some particular designs. The story of the industry's growth is a very general one, embracing all branches of the automobile. This healthy condition is certain to make the automobile a better balanced machine and at the same time serving as an adequate antitoxin to stampedes, which have been characteristic of many makers for many years.

Dimmer Regulation

OFFICIAL automobiledom has taken its first definite step in suggesting adequate ordinances to regulate the glaring headlight that is menacing our highways. By its recommendation of what a good light is, the Standards Committee of the Society of Automobile Engineers has set up an anti-dazzle bogey, which has been demonstrated as safe, conservative and yet adequate for the average automobilist. The recommendation is particularly opportune, coming as it does before the legislatures begin their country-wide annual campaign of anti-motor legislation. The recommendation is a sane suggestion for all legislators and one that no manufacturer or sane automobilist could reasonably object to.

By requiring adequate illumination to distinguish objects on the road at a distance of 150 ft., to distinguish objects on either side of the roadway at a point 10 ft. in advance of the car, and by requiring that the beams of light shall not be over 42 in. from the ground at a point 75 ft. or more in advance of the vehicle, the committee has practically covered the essentials of anti-glare legislation. Their recommendation is particularly commendable in that it makes no endeavor to suggest means of correcting existing glare devices, but rather leaves that to the versatile and inventive genius of the industry. There is not a single recommendation as to how the problem might be solved; only a sane recommendation as to the safety requirements that are necessary in connection with night driving. The recommendations have not been based on mere guesswork but are practically in accord with the findings of various investigating committees that have been analyzing headlight glare conditions in various cities during the past year. The general meeting of the society, held the day following that of the standards committee saw fit to modify this resolution, leaving only that part relating to restriction of light below 42 in., at 75 ft., and beyond and eliminating the parts defining adequate driving light. It seems a pity that the finding of the committee was not backed up by the general meeting; a pity that the membership as a whole has shown itself less courageous than the standards committee. Still the fact that the standards committee approved the resolution is of immense importance, for it means the whole society may approve something equally good before long.

Kelly-Springfield Raises Tire Prices

Increases Range from 7½ to 26%—More Cos. to Raise Lists

NEW YORK CITY, Jan. 4—The looked-for increase in the price of pneumatic tires which was expected to be announced by nearly all of the tire manufacturers Jan. 1 has been announced by only one concern, Kelly-Springfield, whose new prices represent an increase ranging from 7½ per cent on the smaller sizes such as 30 by 3 to approximately 26 per cent on such sizes as 37 by 5. Although none of the other companies has given any intimation of a rise, it is generally rumored in tire circles that one will come Jan. 8.

The present rise is due entirely to increase in the price of rubber, which has risen from 57 cents a pound in September and October to $1.05 yesterday. The rise in price, which has been going on steadily since Nov. 1, started with the reported closing of the Suez Canal, and although this great waterway through which comes all of the crude from the Federated Malay States and Ceylon has not been closed, the rubber price nevertheless has continued to rise. To date only one boat carrying rubber from the East has been torpedoed, this being the Langeon Hall with 500 tons of crude, which was torpedoed early in December. This loss is not sufficient to create any increase in price. At present 60 per cent of the crude used in America comes from the East, and while there has been no shortage of supply, the increase is largely due to the increased demand for rubber. This is due to the greatly increased number of cars in use, and is also due to the large increase in exports, particularly solid tires, to certain of the belligerents.

Some of the Kelly-Springfield prices, new and old lists, follow:

Size	New	Old
30 x 3	$16.35	$15.20
34 x 4	32.95	27.45
34 x 4½	40.55	33.80
36 x 4	35.00	29.15
36 x 4½	42.95	35.80

—

N. A. C. C. Banquet Breaks Record

NEW YORK CITY, Jan. 5—The annual banquet of the National Automobile Chamber of Commerce, Inc., held last night at the Waldorf was one of the largest gatherings of automobile manufacturers in the history of the chamber, and perhaps the largest social event of show week. Three hundred men attended, the number representing the majority of the industry. In the absence of Charles Clifton, president of the chamber, due to illness, Wilfred C. Leland, Cadillac, presided. Senator Gore of Oklahoma was the only speaker and discussed preparedness from its many angles.

An entertaining novelty of the dinner was the menu which took the form of a stock certificate for 1000 shares of stock in the Blue Sky Motor Car Co., incorporated under the State of Collapse. Another novelty was the decorating of five automobile manufacturers for conspicuous accomplishments, the decorations taking the form of huge burlesque medals hung by red ribbons around the necks of the recipients. Those so decorated included John N. Willys, designated as the prince of production; Harry W. Ford, Saxon, for his financing; George Kissel as the knight of the all-winter body; and John F. and Horace E. Dodge for what they have done, their medal being split in two, each receiving a half.

—

Franklin Declares 100 Per Cent Stock Dividend on Common

SYRACUSE, N. Y., Jan. 5—The H. H. Franklin Mfg. Co., this city, has declared a 100 per cent stock dividend on its $900,000 outstanding common stock, payable Dec. 31. Cash dividends for the last half of the year total 38 per cent, one of 10 per cent having been declared for Dec. 31. The common stock was increased to $2,000,000. There is $600,000 preferred in the treasury.

The production for 1916 will be 3800 cars. The company at the first of the new year is two months ahead in orders for cars for delivery to the dealers.

—

White Motor Co. Elects Directors

CLEVELAND, OHIO, Jan. 4—At a meeting of the White Motor Co. held in this city to-day, the following were elected directors of the company: Warren Bicknell, E. W. Moore, Otto Miller and J. R. Nutt of Cleveland; J. H. Harding, of C. D. Barney & Co., Theodore Roosevelt, Jr., of Montgomery, Clothier & Tyler, E. R. Tinker, vice-president of the Chase National Bank of New York, and A. M. Hall, vice-president of the Liberty National Bank, all of New York.

Windsor T. White will shortly be added to the board and made president of the company. Other members to be included are: Walter C. White and M. B. Johnson of Cleveland.

—

Keim N. Y. Locomobile Manager

NEW YORK CITY, Dec. 31—Seymour de Benneville Keim has been appointed manager of the New York branch of the Locomobile Co. of America to succeed J. F. Plummer who resigned as manager of the New York branch a few weeks ago to pursue other business interests. Mr. Keim for several years has been manager of the Philadelphia branch, where he will be succeeded by Arthur Prince Hawes, at present manager of the Boston branch of the Locomobile company.

$3,000,000 Packard Preferred

New Issue of 7% Cumulative Stock Offered at 104 and Accrued Dividend

NEW YORK CITY, Jan. 3—The Packard Motor Car Co., Detroit, Mich., has sold $3,000,000 of 7 per cent cumulative preferred stock to William A. Read & Co., this city, and the latter concern is offering it to the public at 104 and accrued dividend. This stock is callable at any time on ninety days' notice at 110 and accrued dividend per share, and is subject to redemption at par on Aug. 30, 1939.

The cash received by the Packard company from the sale of this new stock will place the company in a position which will enable it to redeem all its outstanding debenture notes, which fall due next December.

The statement of the Packard company for its fiscal year ending Aug. 31, 1915, and published in THE AUTOMOBILE for Oct. 28, showed that the net current assets of the concern were approximately $10,000,000, and that the total tangible assets after very liberal deduction for depreciation were approximately $21,000,000. In the last fiscal year the company's net income available for preferred stock dividends, after depreciation reserves of more than $1,300,000, was $2,265,926. In the past five years investment in the property of surplus profits and reserves exceeded $13,000,000.

—

Packard 10 Per Cent Stock and 1¾ Per Cent Cash Dividend

DETROIT, MICH., Dec. 31—As a fitting climax to the ending of its busiest year, the Packard Motor Car Co. to-day announced that common stockholders will receive a 10 per cent stock dividend in addition to a cash dividend of 1¾ per cent. Payment will be made Feb. 1 to holders on record Jan. 15.

This is the first time a cash dividend is declared on the common stock. A 40 per cent stock dividend was declared Oct. 16, 1913.

Including the stock to be distributed Feb. 1, the total outstanding common stock will be approximately $7,771,830 out of the total of $8,000,000 authorized issue.

—

Reliance Engineering Capital, $1,720,000

LANSING, MICH., Jan. 3—The Reliance Engineering Co. has increased its capital stock from $1,250,000 to $1,720,000. This company recently took over the Saeger Engine Works, the Michigan Crank Shaft Co., and the Emergency Forge Co.

Chevrolet-G. M. C. Deal Strikes Snag

Eight of G. M. C. Directors Opposed to Merger Plan—Voting Trust Proposed

NEW YORK CITY, Jan. 4—A conference of directors of the General Motors Co., held in this city recently developed the fact that a majority of the directors of the company are opposed to the plan for a merger with the Chevrolet Motor Co., advanced by W. C. Durant, who proposed turning a controlling interest in the larger company over to the Chevrolet by means of an exchange of stock. The capital of the latter company, as a result of the plan, was increased from $20,000,000 to $80,000,000.

A letter has been sent to the General Motors stockholders by eight of the fourteen directors of the company stating that they are not a party to any arrangement looking to the vesting of control of the General Motors Co. in any other company, and that they favor the formation of a three-year voting trust beginning November, 1916, at which date the term of the present board of directors expires. These directors ask the stockholders to signify whether they wish to unite in forming such a voting trust, and state that if a sufficient number of the stockholders so desire, action to that end will be taken. The voting trust proposed, which they say is favored by a majority of the board, is to be made up of five members of the present board as trustees, to be selected by the present directors. The statement sent to the stockholders was signed by S. F. Pryor, A. H. Wiggin, Thomas Neal, C. H. Sabin, J. J. Storrow, C. S. Mott, Albert Strauss, and E. W. Clark.

—

Peerless Stock Syndicate Dissolved

NEW YORK CITY, Jan. 5—The Peerless Truck & Motor Corp. stock syndicate, which expired by limitation Jan. 3, has been dissolved and will not be renewed. This means that there are now no restrictions on the sale of the stock by subscribers.

In a statement sent to shareholders President Frederick Gilbart states that the aggregate sales by the company in the eleven months ended Nov. 30, 1915, were $11,458,513 and that net profits, after deduction of charges for maintenance and depreciation, before deducting interest obligations, cancelled or provided for in the formation of the corporation, were $1,903,058. This is at the rate of $9 a share per year, 18 per cent of par value, on the entire outstanding capital stock of $10,000,000, after providing for interest on the corporation's 6 per cent convertible gold notes now outstanding.

The consolidated balance sheet of the subsidiary companies of the Peerless Truck & Motor Corp., as of Nov. 30, follows:

ASSETS

Patents, franchises and goodwill.. ($5,000,000 represented by common stock of General Vehicle Co., Inc., as per contra.)	$5,100,000
Land, buildings, plant and equip..	4,816,586
Investments	511,035
Inventories	1,428,265
Accounts and notes receivable....	655,695
Cash in banks and on hand.....	2,147,008
Prepaid expenses and insurance..	65,418
Development, engineering ex., etc..	184,636
Total	$14,908,646

LIABILITIES

Peerless Motor Car Co. 7% cum. pf.	$2,100,700
Peerless Motor Car Co. com. stock.	2,085,500
General Vehicle Co., Inc., 7% cum.pf	1,200,000
General Vehicle Co., Inc., com. st'k. (This amount represents patents, fr'nch's, goodwill as per contra.)	5,000,000
First mtge. serial gold 6% bonds of the Peerless Motor Car Co.....	900,000
Less—Since retired or to be retired by the Peerless Motor Car Co...	300,000
Mortgage on real estate in N. Y. C.	300,000
Special deposits	175,490
Accounts payable	734,288
Peerless Truck & Motor Corp. advance	50,000
Sundry creditors, including accrued payroll	114,304
Reserves against inven., doubtful accounts, etc.	250,360
Surplus capital created by cancellation of notes payable of General Vehicle Co., Inc., as of Oct. 31, '15.	900,000
Surplus	1,398,003
Total	$14,908,646

—

Standard Steel Car Takes Model Engine—To Double Output

PITTSBURGH, PA., Jan. 3—The Standard Steel Car Co., this city, has taken over the Pittsburgh Model Engine Co., with plants in Pittsburgh and Peru, Ind. The Model Engine Co.'s assets in property, buildings and machinery, when taken over, exceeded $1,000,000.

The production of Standard cars is to be doubled and the manufacture of Pittsburgh Model engines for the trade will be continued.

—

Six Hupmobile Men Promoted

DETROIT, MICH., Jan. 4—The Hupp Motor Car Corp., this city, has made a number of promotions in the factory organization, effective Jan. 1.

Lee Anderson, formerly sales and advertising manager, becomes commercial manager in charge of sales, service and advertising. J. E. Fields, formerly director of the Hupmobile national coupon service plan and special sales representative, becomes sales manager, with H. E. Westerdale as his assistant.

Frederick Dickinson, formerly assistant advertising manager, becomes advertising manager. R. D. Heartz, formerly assistant to Mr. Fields, becomes sales promotion manager. J. S. Patterson, who has handled the Hupmobile publicity, becomes assistant advertising manager. J. L. Kenyon becomes general service manager in charge of technical service, parts stock and orders and claims.

Calls for Gasoline Price Probe

Congressman Introduces Resolution Demanding Punishment of Price Boosters

WASHINGTON, D. C., Jan. 4—That the rapid increase in gasoline is almost certain to bring about a Federal inquiry was indicated to-day when the attention of Congress was directed to it. Congressman Steenerson of Minnesota, introducing a resolution calling upon the Department of Justice to advise whether it has begun prosecutions against those responsible for the increased prices. Price of gasoline in Washington was to-day advanced 1 cent a gallon from 20½ to 21½ cents.

The preamble of the Steenerson resolution asserts that the present price of gasoline is "unreasonable and extortionate" and that it is sufficiently high to injure the industries of the United States.

The resolution directs the Attorney-General to advise what steps he is taking in connection with reports that dealers in the commodity are violating the Sherman anti-trust law. If the department has not begun prosecution, the resolution provides, the Attorney-General shall explain why such prosecutions have not been started and if they are contemplated. The Steenerson resolution was referred to the judiciary committee.

"We will answer the resolution when it comes to us," said Assistant Attorney-General Todd this afternoon when advised of Congressman Steenerson's action in the House.

—

Monihan Forms New Company

NEW YORK CITY, Jan. 5—John G. Monihan, has resigned from active participation in the affairs of the Mutual Motors Co., of Jackson, Mich., and has formed a company of his own, known as the Co-operative Exhibitors of Motor Cars, with headquarters in Detroit, and offices in Cleveland and Buffalo. Mr. Monihan states that the purpose of his new concern is to distribute automobiles, but does not as yet announce the name of the car he is to handle, although it is understood that this will be an entirely new make.

Mr. Monihan retains his position as a stockholder of the Mutual company and as a member of the board of directors.

—

Snell Interstate Production Manager

MUNCIE, IND., Jan. 4—F. E. Snell, who was connected for many years with the Service Motor Truck Co., Wabash, Ind., and the Garford Motor Truck Co., has taken over the duties of production manager of the Inter-State Motor Co.

Gasoline Higher Despite Increase in Crude Output—Retardation Charged

Dept. of Justice and Federal Trade Commission Both Prepare to Investigate Reasons Given for Increasing Price of Fuel—220,000,000 Bbl. of Crude Held in Reserve

WASHINGTON, D. C., Jan. 1—With both the Department of Justice and the Federal Trade Commission preparing to investigate gasoline prices and with the probability that Congress will also take a hand in the matter, the subject is sure to receive a lot of attention during the next few weeks. Official government figures just made public disclosed that in the face of rising prices of gasoline, production of crude petroleum during the last year was greater than in 1914, although production was "purposely retarded as far as practicable," that reserve stocks of crude petroleum now being held in the country are the largest ever recorded, and that exports of gasoline, to which the rise in prices frequently has been attributed, were in the last ten months of 1915 less than the exports during the corresponding period of the two years previous.

A statement issued by the Geological Survey estimated the 1915 production of market petroleum at 267,400,000 barrels, 2000 barrels more than in 1914. "This," says the statement, "does not agree with the currently reported reason for the exceptionally high prices now prevailing for motor fuel. As a result of the overload put on the transporting and refining phases of the petroleum industry by the excess output of 1914, the year 1915 may be characterized as a period of readjustment, in which production activity was purposely retarded as far as practicable. The small increase, therefore, is more significant than the simple figures indicate."

Factors that might be expected to affect the price of gasoline, according to the survey officials, are production, consumption and prices of crude petroleum. Consumption figures, they said, were not available, though consumption was increasing. A low petroleum price level was reached in April and until August the price remained at $1.35 a barrel for the market standard. Then the price began to soar, and on Dec. 17 petroleum was selling at $2.15. Indications now are, says the statement, that the price soon will reach $2.50, its previous high record.

Reserve of 220,000,000 Barrels

One production fact brought out by the survey is that crude petroleum stocks held in reserve, the largest ever known, increased 50,000,000 barrels in 1915, and at present more than 220,000,000 barrels are being held. Field storage by producers accounts for 24,000,000 barrels of this.

Export figures for the first ten months of 1915 show that gasoline exports dropped far below the same period in 1914, and slightly below 1913. During the ten months ended with October last 98,471,466 barrels left the United States against 140,275,273 barrels for the same period of 1914 and 100,353,871 barrels for 1913.

The relation between the cost of crude petroleum and gasoline is hard to determine, according to officials who have given the subject study, because of the varying grades of petroleum and the variety of oils produced in refinement. An increased demand for gasoline, they say, means an increased production of kerosene, lubricating oils and other petroleum products. All petroleum products have risen in price.

Rittman Process Influence

Officials familiar with the situation say the recent discovery of Dr. Walter F. Rittman, a government chemist, of a process for obtaining from crude oils 200 per cent more gasoline than by old methods, probably will have a bearing on both production and price before another year had passed. Several companies already have started production under the new method. Their output, and the output of others to be started, it was said, would be felt soon on the market.

In connection with the gasoline question some interesting facts have been developed by Judson C. Welliver, of this city, who is an authority. Some points brought out in an interview with Mr. Welliver are of interest at this time. "The government's big investigation of the whole petroleum products situation in this country has thus far tended to increase the mystery about tendencies in the oil business," said Welliver. "Less than three years ago authorities on oil matters were diligently predicting that conditions, which were then thoroughly bad, were going to be worse. The refiners in the midcontinent field were pictured as practically all losing money with every indication that they were going to lose more or else be forced out of business.

"Despite this gloomy forecast the price of gasoline is now high and mounting higher. There has been prophecy lately that it would soon reach 25 cents the gallon, and might get to 35 at no distant period. The investigators want to know why; and they are not finding out very fast.

War Affected Supply Little

"One part of the explanation, which occurs promptly to the inquirer, is that the war has created a huge, unexpected demand. I asked one of the government authorities, and he declared that he did not consider this true. While detailed figures on export of petroleum products as affected by the war had not been studied, it was doubted if, in fact, any more gasoline had been sold since the war began than before. The explanation was that for a considerable time after war started the oil steamships, which were largely sailed under the British flag, were off the seas; there were too many German cruisers turning up in unexpected places. By the time these commerce destroyers were cleared away, a big volume of sales had been lost. Since then the Allies have been taking large quantities of gasoline, but they have not been able to take as much as they wanted, because there were not ships to handle it. Some of the midcontinent refiners have recently been quoted as saying that they could send several times as much gasoline abroad if they could get ships to carry it. Moreover, the big Austro-German market has been cut off entirely from commerce in the fuel in recent time.

Seeking Other Causes

"So the investigators are seeking other causes for the increase in gasoline's price. Among the possible causes is the fact that production in the great Cushing, Okla., field is beginning to diminish. This was the greatest oil field ever opened in the world. It turns out a very high grade of crude oil for gasoline purposes; so good, in fact, that refiners in other sections of the midcontinent field found themselves under necessity of extending pipe lines to Cushing or using great numbers of tank cars in order to supply themselves with this high-class crude. The business got adjusted to the notion of making Cushing oil the basis, and now that the production there is falling off it is suspected that there is difficulty readjusting."

Avery to Make Tractor at $295

PEORIA, ILL., Jan. 2—The Avery Farm Implement Co. has decided to add tractors to its line, and equipment has been installed to produce a new model which is to be placed upon the market this year for $295, the lowest price ever quoted for a farm tractor. Models were shown during the past fall at the leading fairs and implement shows of the United States and orders have been received for 800. It is planned to manufacture several thousand during the

coming year. The new tractor displaces four horses, and in addition, can be belted to any farm machinery, developing 10 hp. when used as an engine. It will pull two plows of 12-in. width at a depth of 6 in. in ordinary stubble ground; a 6-ft. disk harrow over plowed ground; a four section spike tooth harrow over plowed ground; a grain drill; a road drag; two loaded farm wagons; or anything else upon the farm that requires four horses to move. It will also operate a silo filler or feed grinder or any other farm implements of the present day.

—

May Examine Mass. Motorists

BOSTON, MASS., Jan. 1—The Safety First propaganda is to be carried before the Legislature this year according to plans now being formed, and it is possible that all future motorists in Massachusetts may have to pass an examination. Secretary of State Langtry has filed a report with the Highway Commission urging the appointment of from 1000 to 1500 persons, motorists as well as non-motorists, to act as monitors throughout the State. They would be given a badge by the commission, and authorized to warn drivers seen operating recklessly, and also report them to the commission. If a driver were reported two or three times by different monitors that would be evidence enough to cause a suspension of his license. The monitors would not have police power to make arrests.

The other movement has been started by the Highway Safety League. Its secretary, Lawrence G. Brooks, has filed with the incoming Legislature a bill calling for the examination of all motorists as follows:

Section 1. Before granting a license to operate a motor vehicle the Highway Commission shall make an investigation into the mental, moral and physical qualifications of the applicant, such investigation to include a practical test of the applicant's ability to operate a motor vehicle and of his familiarity with the motor vehicle laws, and no license shall be issued until the commission or its authorized agent is satisfied that the applicant is a proper person to receive it. The foregoing provision shall only apply to applications for licenses made after the passage of this act.

Section 2. All acts or parts of acts inconsistent herewith are hereby repealed.

Section 3. This act shall take effect upon its passage.

$20 Fine for Jaywalking

On top of this Boston has put into effect its ordinance compelling all pedestrians to cross the streets at cross-walks where police officers direct traffic, and there is a penalty of $20 for crossing when the officer has signaled to vehicles to proceed.

—

Porter With Smith Form-a-Truck

CHICAGO, ILL., Jan. 3—Samuel D. Porter has been appointed general sales manager for the Smith Form-a-Truck Co., this city.

Overland Larger Four $55 Lower

—

Quantity Production and Abu n dant Material Permits Reduction from $750 to $695

TOLEDO, OHIO, Jan. 4—The Willys-Overland company has reduced the price of its larger four-cylinder Overland car $55, or from $750 to $695. It is stated that this reduction is made possible by the foresight of President Willys of the Overland organization in purchasing materials before war sent prices soaring. As an example of the economy effected as compared with present prices of these materials, the company has been able to save $3,500,000 on aluminum alone, while the savings on steel and other raw materials is in proportion. Quantity production is another factor in the reduced price of this model 83-B, large factory additions recently completed having enabled the company to more than treble its output of a year ago.

More than 50,000 cars of this model have been sold in all parts of the world since June, breaking all Overland sales records, more cars having been delivered in the past few months than in any previous year of the company's history.

—

Federal Truck Announces 2-Tonner at $2,100

DETROIT, MICH., Dec. 31—The Federal Motor Truck Co. has brought out a new 2-ton model. This was made necessary owing to the increasing demand from Federal distributors for a truck having a greater carrying capacity than 1½ tons and yet less than the 3½-ton truck which the company is making. Many business houses have been inquiring for such a medium model.

The price of the new truck is $2,100. It will be optional with the purchaser to have his truck with either a wheelbase of 144 in. or of 168 in. The motor is a Continental 4⅛ by 5¼. The ignition is single, the Eisemann being used. The gearset is of the selective sliding gear type. The axle is of the floating type. Springs are semi-elliptic. The front solid tires are 36 by 4 in., the rear tires 36 by 6 single or 36 by 4 dual.

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Lewis, of Mitchell-Lewis, Dies

RACINE, WIS., Dec. 30—William Turnor Lewis, second vice-president of the Mitchell-Lewis Motor Co., Racine, Wis., one of the founders and principal stockholders in the concern, died suddenly on Dec. 30 at his home, from apoplexy. Mr. Lewis was born in Utica, N. Y., on March 10, 1840. His first occupation was that of a telegrapher. Mr. Lewis served through the Civil War as a military operator. In 1864 he married Mary Mitchell, daughter of Henry Mitchell, the first wagon manufacturer in the Northwest and founder of the business which in later years became the $10,000,000 Mitchell-Lewis Motor Co. When the present concern was organized, Mr. Lewis preferred to take a post of lesser importance and made his son, Capt. Wm. Mitchell Lewis, president. However, Mr. Lewis took an active interest in the affairs of the company until the day of his death. He served two terms as a State Senator and once was a popular choice for the nomination for United States Senator from Wisconsin. He is survived by a son, Captain Lewis, two daughters, and the widow.

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Kentucky Wagon to Assemble Cars for Dixie Co.

LOUISVILLE, KY., Jan. 1—At a special meeting held Friday, a contract whereby the Kentucky Wagon Manufacturing Co. will assemble automobiles for the Dixie Motor Car Co., a concern in process of organization, for a period of 5 years, was approved by the stockholders.

The proposed concern will pay the wagon company a stipulated sum to assemble the cars and manufacture certain parts. R. V. Board, president of the wagon company, will be president of the wagon company's new enterprise. He announced to the wagon works' shareholders at Friday's meeting that they would be privileged to subscribe to stock in the automobile company on a pro rata basis.

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2000 Moline Tractors for 1916

MOLINE, ILL., Jan. 2—The Moline, Ill., Plow Co. will, during the coming year, manufacture 2000 farm plow tractors. The two-plow tractor with plows of 12 and 14 in. in width, will be specialized, as this style has the advantage of being able to make a very short turn at the end of each furrow. The price has been fixed at $750.

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Ford Tractor Plant for Canada

FORD CITY, ONT., Jan. 4—The Ford Motor Co. of Canada has purchased a site for the erection of a tractor manufacturing plant. Mr. McGregor is manager.

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Trumbull Receiver Appointed

BRIDGEPORT, CONN., Dec. 31—Attorney E. K. Nicholson of this city, has been appointed temporary receiver of the Trumbull Motor Car Co., this city, with a bond of $25,000. At a stockholders' meeting recently it was voted to discontinue the business of the concern and the officers asked for the appointment of a temporary receiver.

S.A.E. General Meeting Modifies Headlight Resolution

All New Standards Passed—Small Attendance at Business Session—Constitution of Nominations Committee Discussed

NEW YORK CITY, Jan. 5—The business session of the S. A. E. opened this morning at 10.30, an hour later than scheduled. The business was mainly of a formal character, including the election of officers for the session 1916-1917, the acceptance of the treasurer's report, and passing of the general meeting upon the new standard resolutions passed the day previous by the standards committee and the council.

All these standards resolutions are reported on pages 19 to 23 and every one was accepted by the general assembly with the exception of the headlight resolution, which was modified a good deal.

Headlight Resolution Modified

On the presentation of the report of the electrical equipment division, the chairman, A. L. Riker, who had been absent from the standards committee meeting on Tuesday on account of sickness, stated that he personally did not agree with the resolution propounded by his division. His idea was that it was too sweeping and outside the province of the society. He said he did not think the society should go into legal questions but should confine its attention to engineering matters. President VanDervoort, speaking from the chair, said that he thought the subject ought to be discussed very fully indeed as it was of such great importance, and indicated that his own feeling was not entirely in accord with the resolution as passed by the standards committee and quoted on page 21 of this issue.

Hot Discussion Follows

The discussion following Chairman Riker's announcement was one of the most vigorous ever heard. It was very long, occupying most of the morning, and the final result was that the resolution was cut down so as to read:

> "The Division suggests as recommended practice the following, as a standard provision for the regulation of headlight illumination.
>
> "The headlights shall be so arranged that no portion of the reflected beam of light, when measured 75 ft. or more ahead of the lamps, shall rise above 42 in. above the level surface on which the vehicle stands."

It will be observed that this amended resolution confines itself to what the lamps shall *not* do and omits all reference as to what they *shall* do.

In the discussion the many speakers changed their exact opinions a good deal as the discussion progressed, but the apparent main reasons for the action taken were two in number. First, it was pointed out by several speakers, that electric cars and trucks, especially the latter, very seldom had lamps that would illuminate the road 150 ft. ahead of the vehicle, and that the recommendation as it stood would compel the purchase of new lamps by a great many users of automobiles, should it be adopted for legislative purposes.

Secondly, there was a fairly strong feeling evident that the subject was a dangerous one, that the S. A. E. might find the result of standing back of such a resolution extremely troublesome. In other words that it would involve taking part in activities outside the proper sphere of the society.

Innumerable Angles

Nearly every speaker had a different viewpoint. K. W. Zimmerschied, chairman of the standards committee pleaded for the resolution as it stood originally, saying that the present legal restrictions in different parts of the country are such that no one headlight can comply with them all. That it was essential someone should set up a definite guiding rule for legislators. He preferred the original resolution, but would sooner have it as amended by Mr. Riker than have it referred back to the division. In this view Mr. Zimmerschied was supported by a few, notably B. B. Bachman who, as a man vitally interested in the running of trucks went on record to the effect that illumination of a thorough character was essential to the safe operation of any sort of vehicle.

It was stated that the electric passenger cars were among the worst offenders on the glare question despite the fact that their light was not good from the driver's viewpoint. The president added a comment that it would seem to be difficult to compel a man to have so much light, in many cities all the law enjoined was that there should be a white light on either side to render the approach of the vehicle visible to another road user.

This led to a side discussion as to whether or not a *sufficiency* of light for safe driving ought or ought not to be a subject of legislative activity.

Finally on being put to the vote Mr. Riker's amendment was accepted, and will go through the mails to the full membership.

Nomination System Discussed

Under the head of "new business" W. H. Conant proposed that the method of selecting members for the committee upon which devolves the nomination of officers should be changed. At present the committee has seven members and the idea is that they shall be truly representative of the industry. Mr. Conant held the view that the present committee gave too strong a representation to certain sections and he suggested a new rule to the effect that each section of the society should select one member giving the minimum membership of the committee as five.

In discussion, which was vigorous, it was ascertained that only about half the total membership of the society is contained within the sections. So J. N. Heald proposed that the committee should consist of two nominees, not members of sections and a nominee from each section in addition.

The president said that the matter would have to be submitted to the whole membership by mail, sixty days before the summer meeting before anything could be done, so it was left to Mr. Heald and Mr. Conant to prepare written suggestions which could be dealt with in this way.

New Members of Council

As usual every nominee was accepted, for the new officers and councilmen, Russell Huff becoming president, with vice-presidents Eugene S. Foljambe and Robert H. Combs. Members of council to serve one year are David Beecroft, Directing Editor THE AUTOMOBILE, Edwin R. Hall, Goodyear Tire & Rubber Co., and John G. Utz, Perfection Spring Co. To serve one year on the council, George W. Dunham, consulting engineer. For treasurer, Herbert Chase was chosen.

New U. H. Klaxon Horn at $12

NEW YORK CITY, Jan. 4—A new motor-driven horn styled U. H. Klaxon, has been brought out for $12 by the Lovell-

McConnell Mfg. Co., Newark, N. J. It resembles the Klaxonet in shape but is longer and in that the motor shaft is horizontal and carried in a housing directly back of the horn bell. This motor drives a cam with many teeth cut on it, which vibrates the diaphragm and thus produces the sound.

It operates on 6 volts and is finished in black, which is the standard finish for the coming year. The other models will be continued. These include the Klaxonet, $15; U. H. Klaxet, $6; and the Klaxon, $20.

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Promotions for Three Goodyear Men

AKRON, OHIO, Dec. 31—At the annual meeting of the Goodyear Tire & Rubber Co., Akron, Ohio, the promotion of secretary G. M. Stadelman, who has been sales manager throughout the Goodyear up-building, to a vice-president. He continues as sales manager.

P. W. Litchfield, who has been with Goodyear as factory manager almost since the beginning, was also elected a vice-president. A. F. Osterloh was elected secretary. He is also assistant sales manager.

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233,325 N. Y. Cars Registered

ALBANY, N. Y., Jan. 4—Receipts aggregating $1,905,153 are reported by the Automobile Bureau for the eleven months ending Dec. 31, 1915. The whole of 1914 totaled only $1,618,060.

For the eleven months a total of 233,325 automobiles had been registered by owners or dealers—231,126 by the former and 2199 by the latter. During the same months in 1914 a total of 169,966 cars were registered, or 61,160 less than this year; dealers numbered 1743 and owners 168,223.

There were 101,074 cars registered in the New York City district up to Jan. 1, 1916; 72,815 cars were registered in the Buffalo district, and 57,237 in the Albany district.

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Springfield Metal Body Detroit Plant Ready by March 1

NEW YORK CITY, Jan. 1—The Detroit plant of the Springfield Metal Body Co. will be ready for occupancy betwen Feb. 15 and March 1. This plant is somewhat smaller in area than the other one, in Springfield, Mass. There is a possibility that the main office may be in Detroit, but as yet nothing has been settled in regard thereto.

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Middleton Steel Products Representative

DETROIT, MICH., Dec. 31—Ray T. Middleton will be Michigan representative and manager of the local branch of the Steel Products Co., Cleveland, beginning Jan. 1. Headquarters have been opened in the Ford building.

Freight Car Shortage Again Acute

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N. A. C. C. Announces 15,582 Carloads Shipped in Dec., an Increase of 144 Per Cent

NEW YORK CITY, Jan. 5—That the freight car situation has again become acute is brought to light by the report of the traffic committee of the National Automobile Chamber of Commerce submitted at the annual meeting to-day. The shipments of automobiles for the month of December amounted to 15,582 carloads. This is an increase of 144 per cent over the same month of last year when 6378 were shipped. The number of freight cars for automobiles now in service is 59,274 and these will shortly be increased by 10,000 as the New York Central will soon put on 9000 more freight cars and the Pennsylvania road 1000.

The traffic department of the Chamber of Commerce intends to have representatives visit all centers to confer with the local traffic organizations for the purpose of securing co-operation. The traffic department is also in correspondence with every railroad for the purpose of securing more cars and impressing on the freight departments the necessity for quick return of the unloaded cars to the proper terminals.

Besides the routine business taken up at the meeting to-day, the Chamber has approved the recommendations of the Society of Automobile Engineers on standardization of methods of numbering motors, the uniform license plate and the proposed anti-glare headlight ordinance. These matters are at present before the S. A. E. for adoption and the approval of the N. A. C. C. will undoubtedly carry considerable weight.

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Percy Owen Retires from Active Service With Saxon

DETROIT, MICH., Dec. 31—Although remaining as a director of the Saxon Motor Car Co., of which he was one of the organizers, Percy Owen has retired from all active service according to an announcement made by officials of the Saxon company. Mr. Owen had been giving special attention to all matters pertaining to the sales of the company.

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Motor & Accessory Manufacturers Meet

NEW YORK CITY, Jan. 5—A meeting of the Motor & Accessory Manufacturers' Assn., was held in this city to-day at the Waldorf-Astoria where action was taken in regard to the election of four new directors to succeed the four retiring as follows: F. Hallett Lovell, Jr., C. E. Thompson, Alfred P. Sloan, Jr., and C. E. Whitney. About 100 members were present at the meeting. The four directors are elected for three years.

President Lovell's report showed that there are 241 members in the association. C. W. Stiger, chairman of the finance committee and J. S. Marvin, of the traffic department, made reports.

To-morrow the association will meet at its offices to elect officers. The present officers are: President, F. Hallett Lovell, Jr.; vice-president, C. A. Stiger; second vice-president, C. E. Thompson; third vice-president, T. J. Wetzel; treasurer, L. M. Wainwright, and secretary and assistant treasurer, A. P. Sloan, Jr.

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General Motors Common Pays 20 Per Cent

NEW YORK CITY, Jan. 5—At to-day's meeting of the board of directors of the General Motors Co. the main issue on which action was taken was the placing of the common stock on a regular dividend basis of 20 per cent yearly. L. G. Kaufman, president of the Chatham & Phoenix National Bank, this city, was elected chairman of the board to succeed Emory W. Clark of Detroit, who was re-elected to that capacity at the annual meeting on Nov. 16. In confirming the decision as to dividends Mr. Kaufman refused to make any statement as to the affairs of either the General Motors or Chevrolet interests.

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Ross & Young Machine Capital Now $750,000

DETROIT, MICH., Jan. 4—The Ross & Young Machine Co., established in 1910 with a capital stock of $35,000 has increased its capital to $750,000. This company also operates and controls the Ross Automobile Co., which incorporated in July, and is capitalized at $300,000. The latter company is bringing out a new model eight this year and is now making arrangements for a large production. The new Ross is to be shown in Chicago in connection with the annual automobile show.

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Fitzsimmons Steel Products Breaks Ground

MILWAUKEE, WIS., Jan. 2—The Fitzsimmons Steel Products Co., which is the Wisconsin interest of the Fitzsimmons Steel & Iron Co., Chicago, Ill., has broken ground for a new steel finishing mill and power house in the Menomonee Valley at Milwaukee, Wis. The plant will be used exclusively for the production of cold drawn steel products. The factory will be 105 by 200 ft. on a site 200 by 275 ft. fronting both on the canal and the railroad tracks. Carl and Ernst Prinz of Milwaukee are among the principal stockholders

$4,000,000 Co. May Take Grant

Detroit and Chicago Interests Forming Corporation—Syndicate to Market Stock

DETROIT, MICH., Jan. 3—Andrews & Co., of this city and Chicago, and Livingstone & Co. are interested in a new corporation now being formed with a capital stock of $4,000,000 to take over the business of the Grant Motor Co., Findlay, Ohio.

These brokers will take $1,000,000 in preferred stock and $2,000,000 in common stock. The balance of $1,000,000 of common stock is to be held to exchange it for the preferred stock.

A syndicate is now being formed by the purchasers for the purpose of underwriting $1,000,000 preferred and $600,000 common stock and place it on the market. The preferred stock, which will pay 7 per cent dividends, is to be convertible into common at the option of the stockholder, prior to Jan. 1, 1919. After that time it will be redeemable at 120 plus the accrued dividends.

The present capital stock of the Grant Motor Co., which was organized in 1913, is $200,000. This is double the original capitalization.

Rockwell-Drake to Make Ball Bearings—May Remove to Plainville

HARTFORD, CONN., Jan. 1—It is admitted by Hugh Rockwell and L. A. Drake of the recently organized Rockwell-Drake Corp., which, among other things, is to make ball bearings, will remove to some location other than that at 78 Grove Street in Hartford. Because of this fact, coupled with the knowledge that A. F. Rockwell, late of the New Departure Manufacturing Co., and father of the younger Rockwell, acquired a site in Plainville, it is assumed the firm will locate there. The members of the firm are non-committal on the subject and the senior Rockwell says he is not interested. Messrs. Rockwell and Drake were formerly with the New Departure Manufacturing Co.

Martin Rocking Fifth Wheel Co. Organized in Springfield

SPRINGFIELD, MASS., Dec. 31—The Martin Rocking Fifth Wheel Co. has taken over the business and the patent rights of C. H. Martin, this city. The officers of the new corporation are C. H. Martin, president, Adolf A. Geisel, treasurer and H. G. Farr, secretary. Mr. Geisel, who will have the general management of the business, has been connected with the automobile industry for the past fifteen years.

The tractor-semi-trailer business had grown to the point where it was necessary to take in additional capital in order to supply the fifth wheel connections as fast as they were ordered. In addition to making fifth wheels in different sizes—from one that makes a Ford roadster into a 1-ton tractor to one that makes a 5-ton truck into a 10-ton tractor—the new company plans to make semi-trailers for the Ford size.

Pfau Mfg. Co. Enters Field

CINCINNATI, OHIO, Jan. 1—The Pfau Mfg. Co., this city, which has been engaged in the manufacture of brass goods in this city for the last twenty-five years, will expand this department to enter the automobile field. The company will be prepared to furnish to the trade large quantities of brass specialties. The company is in a position to duplicate any articles of brass tube and rod, or stamped products of sheet steel, iron, copper or brass. It is not the intention to manufacture large sheet metal parts like hoods, fenders, etc., but to make small and medium-sized specialties for manufacturers of automobiles, and also for those engaged in the manufacture of automobile accessories such as radiators, gasoline tanks, etc.

Detroit Steel Products Co.'s Production Increased Sevenfold

DETROIT, MICH., Jan. 1—The automobile spring plant of the Detroit Steel Products Co. is now in a position to handle about seven times as much production as a year ago. Production increases throughout 1915 were marked, averaging 43 per cent in February, 30 per cent for May and 25 per cent for June, and 24 per cent in August. November production was held up slightly because of inability to obtain sufficient steel, but it is expected that December's production will have increased sevenfold over January's record.

Simplex Plant to Be Enlarged

NEW BRUNSWICK, N. J., Jan. 2—The plants of the Simplex Automobile Co., this city, are being materially enlarged for the manufacture of aeroplane motors on designs and under the patents of the French motor which representatives of the company have secured in France through the assistance of the French government. The motors, which are being made for the Wright Aeroplane Co., will be made under license, free of charge.

Contracts for the construction of additional buildings at the Simplex plant to cost $300,000 have already been let and more than $200,000 worth of new machinery has been ordered. It is planned to increase the output of the Simplex plant to 100 motors a day.

A. B. C. Starter Co. Formed

C. P. Sieder, Alexander Churchward and B. S. Colburn, Incorporators

NEW YORK CITY, Jan. 4—The A. B. C. Starter Co. has been incorporated in Michigan for $150,000 by Charles P. Sieder, Alexander Churchward and B. S. Colburn. Mr. Sieder is president and general manager; Mr. Churchward, vice-president and chief engineer, and Mr. Colburn, secretary and treasurer. The company will manufacture a lighting and starting system adaptable to Ford cars. The system is of Mr. Churchward's design and has independent units for starting and lighting. The entire outfit, according to Mr. Churchward, will weigh less than 100 lb. and will be on exhibition at the Ward Leonard booth at the Grand Central Palace show before the end of the week.

The starting motor is series wound and provided with a Bendix gear. It will have 150 lb. stalling torque and is fitted with a Bendix drive geared 14 to 1 to the flywheel. The generator is driven from the same belt as drives the fan, this being a patented feature. The generator is a slow-speed machine and its ratio to the crankshaft is 1¼ to 1. The generator cuts in at 8 m.p.h. and carries a full lamp load at 10 m.p.h. It is designed to operate in conjunction with a 6-volt, 60-amp. battery, and is fitted with the Ward Leonard magnetic regulating system.

American Rotary Valve Discontinues Electric Motors

ANDERSON, IND., Jan. 1—The American Rotary Valve Co., this city, announces that, due to the development of business on the Arvac universal joint, which it manufactures, and to which the company will now devote its entire effort, the manufacture of electric motors, press drives and its present line of vacuum cleaners will be discontinued. It will fill orders at present in hand, and continue to provide repair service on all these lines.

New Factory for S. K. F.

HARTFORD, CONN., Jan. 1—A permit to build a factory of brick, one and two stories to cost $150,000 has been issued to the S. K. F. Ball Bearing Co. The building is to be 180 by 200 ft.

Piston Ring Co. Expands

MUSKEGON, MICH., Dec. 29—Twelve lots have recently been purchased by the Piston Ring Co. and the company will put up a new large building, 125 by 180

ft., which will more than double the present factory capacity. Between 100 and 150 more men will be added to the working force. The new building will cost about $20,000 and about as much will be spent for additional equipment and machinery. At the present time day and night shifts are working and the company has more orders than at any other time since it started in business.

It is said that president Charles E. Johnson of the Piston Ring Co. will back a new company now being formed and which will make automobile parts. This concern's business will not interfere with that of the piston ring company.

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American Tire Fabric Co. Formed, Capital $1,500,000

BOSTON, MASS., Dec. 31—The American Tire Fabric Co. of Boston and New York has organized under Massachusetts laws with an authorized capital of $1,500,000, consisting of 35,000 first preferred, 65,000 second preferred and 50,000 common, all of $100 par value. The purpose of the company is to manufacture, buy and sell cotton, yarn and other textile fabrics.

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Auto Parts Co. Reorganizes and Absorbs Badger Specialties

MILWAUKEE, WIS., Jan. 3—The Auto Parts Mfg. Co., 528-532 Broadway, Milwaukee, has effected a reorganization and absorbed the Badger Specialties Mfg. Co., also engaged in the manufacture of accessories, sundries, parts, etc. Andreas M. Soennichsen recently retired from the company to organize the A. M. S. Mfg. Co. The active management of the Auto Parts company is now in the hands of W. N. Schwab, general manager; C. W. Beckler, sales and advertising manager, and F. B. Sykes, factory manager. B. L. Hibbard is president of the company and the other directors are: P. D. Durant, T. J. Pringle, J. D. Millar, H. Nauman, Charles Thompson, E. O. Ellsworth and William Lindsay.

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$1,000,000 Goodyear Plant for Canada

NEW TORONTO, ONT., Jan. 3—Arrangements are being made by the Goodyear Tire & Rubber Co., Akron, Ohio, to establish a Canadian plant at New Toronto. A by-law will be shortly submitted to the ratepayers to grant a fixed assessment of $1,000 an acre on the 27 acres to be used for the plant. The Goodyear people have agreed to spend $1,000,000 on the plant.

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Rock Hill Co. Makes Ford Bodies

ROCK HILL, S. C., Dec. 31—The Rock Hill Buggy Co., this city, is building standard commercial bodies for the Ford chassis in quantities.

12,000,000 Champion Plugs in 1916

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Annual Convention Held at Factory Attended by Complete Sales Organization

TOLEDO, OHIO, Dec. 30.—The annual sales convention of the Champion Spark Plug Co. was brought to a close here yesterday. The complete sales organization, which since 1913 has grown from three to twenty-six members, being in attendance during the three days of the convention. Full details of the company's policies during the present year were discussed and from the enthusiasm at the various meetings, it seems likely that the output of 12,000,000 spark plugs for 1916 will be more than sold. Among those present were: D. M. Barrett, editor of Salesmanship; Henry Paine, general attorney; Harry Harper, sales manager; Willys-Overland Co.; Wilbur Owen, Champion Spark Plug Co. patent attorney; M. DeWitt, president, J-D Co.; President R. A. Stranahan, Advertising Manager H. L. Corey, Treasurer F. D. Stranahan, Sales Manager F. D. Caswell, Purchasing Agent J. F. Barr, H. W. Biddle, C. B. Clark, J. T. Moultroup, George French, Jr., Charles Corwin, H. A. Kaiser, E. M. Stern, W. F. Minnich, H. C. Thanasse, W. J. Shay, C. L. Ughetti, K. Latta, H. MacLaren, Harold E. Butcher, E. H. Blackwell, H. A. Krause, E. C. McKinney, R. C. Parrish, J. B. Cox, H. A. Houston, O. C. Rohe, Charles DeWar.

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Goodyear Gives Insurance Policies to Employees

AKRON, OHIO, Dec. 31—The Goodyear Tire & Rubber Co. will give its employees an insurance policy for $1,000, free of all cost, provided the employee is or becomes a member of the Goodyear Relief Assn., which provides sick and disability insurance. Under its new plan it establishes retirement awards, and also a group insurance plan. The retirement awards make provision for stated monthly payments for life to men who have reached the age of seventy and women who have reached sixty-five, and there is also a condition under which old employees may retire, with awards, under the age limits mentioned.

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Robbins & Myers Gives Insurance Policy to Each Employee

SPRINGFIELD, OHIO, Dec. 31—The Robbins & Myers Co., this city, manufacturer of electric motors, generators, etc., handed an announcement to each of its employees on Thursday, Dec. 23, to the effect that a life insurance policy had been taken out by the company for every employee. The policy is paid for by the company and all premiums are paid as long as the employee is connected with the concern. The amount of the policy increases with the length of time of the employee's service, as follows:

One year or less	$500
One year and under two	600
Two years and under three	700
Three years and under four	800
Four years and under five	900
Five years and over	1,000

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Jeffery Gift of $40,000 to Employees

KENOSHA, WIS., Jan. 2—The largest distribution of profits to employees ever made by a Kenosha concern was the gift of $40,000 to the 3000 operatives in the plants of the Thomas B. Jeffery Co., Kenosha, Wis., in connection with the weekly pay-roll on Dec. 27. The regular pay-roll amounted to $60,000, making a total distribution of in excess of $100,000. A full week's pay was given to each of the 2700 employees working for the company on June 1, 1915, and one-half week's pay to the 300 employees who have been with the concern since that time.

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Harper's Latest Trailer

SOUTH BEND, IND., Dec. 31—The Harper Buggy Co., Columbia City, Ind., is manufacturing a trailer of 1500 lb. capacity, arranged to be attached to a motor vehicle by means of a universal joint connection.

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Hudson Gives Christmas Presents

DETROIT, MICH., Dec. 30—The Christmas gift of the Hudson Motor Car Co. to those of its factory workers on the payroll six months or longer was a week's wages, while all office employees with the company one year or longer also received an extra week's pay. It is said that over 700 employees came within these regulations and that about $20,000 was involved.

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Dort Employees Receive Present

FLINT, MICH., Dec. 24—The Christmas present of the Dort Motor Car Co., and the Durant-Dort Carriage Co., to their employees, was in the shape of $300 which has been deposited with the Flint Vehicle Factories Mutual Benefit Assn. The money is to be credited upon the insurance accounts of all the employees of both concerns.

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Cash Gift for Bowser Employees

FORT WAYNE, IND., Jan. 1—All employees of the Bowser Tank & Pump Works, this city, received a cash Christmas gift from the company when between $6,000 and $7,000 were given directly or sent to the 1700 persons connected with the institution. The gifts were from $2 to $5 each.

New Finance Plan for S. R. B.

Assessment of $730,713 to Reduce Debt and Capital $1,908,077

PHILADELPHIA, PA., Jan. 2—Stockholders and creditors of the Standard Roller Bearing Co., this city, have been presented with a plan for the refinancing of the company. The company proposes to make an assessment of $730,713 on stockholders, and to reduce the debt and capital from $5,799,835 to $3,891,758, with further provisions that the holders of notes and other payable accounts are to be offered the alternative of 60 per cent of their claims in cash as payment of debts in full, or 80 per cent of their claims in the shape of redeemable income certificates covering a period of twenty years. The assessment will be made on the basis of $15 per share of first preferred, in return for which the holders will receive 7 per cent new preferred and 50 per cent of the present holdings in new common stock. Second preferred will be assessed $7.50 per share, in return for which new preferred will be paid, in addition to 25 per cent of holdings in common stock. The assessment will also include common stockholders who will receive 20 per cent of their holdings in common stock.

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Premier Motor Corp. Incorporated

DOVER, DEL., Dec. 30—The Premier Motor Corp. has been incorporated in this State with a capital of $2,000,000. The incorporators are: H. E. Latter, N. P. Coffin, C. M. Egner, all of Wilmington.

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N. A. C. C. Book on Supervision of Automobile Equipment

NEW YORK CITY, Jan. 1—The traffic department of the N. A. C. C. and the Motor and Accessory Manufacturers has compiled a booklet to facilitate the return of automobiles sent by rail and to serve as a ready reference. This book has been distributed so that better supervision of automobile equipment will be made by the railroads over which approximately 140,000 carloads of automobiles were shipped in 1914. It is expected that shipments in 1915 will exceed 200,000 carloads.

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Westcott Not in Indiana Merger

RICHMOND, IND., Jan. 2—The recent publication of a rumor that the Westcott Motor Car Co. is to enter a combination of Indiana automobile and parts companies has brought a vigorous denial from H. G. Root, general manager of the Westcott company. Mr. Root declares that the Westcott company will not enter the proposed merger and has not even been contemplating such action.

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Morgan & Wright Add $600,000

DETROIT, MICH., Dec. 31—Morgan & Wright, this city, have increased their capital stock from $5,000,000 to $5,600,000. Approximately $500,000 of the new capital will be issued at once while the remainder will be held in reserve. It is said that plans are under way for increasing the expansion of facilities of the company which has been going on for some time.

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Goodrich Directors Meet Jan. 26

AKRON, OHIO, Jan. 3—The directors of the B. F. Goodrich Co. will meet for action on the common dividend, Jan. 26.

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Hupp Gains 25 Per Cent in Quarter

DETROIT, MICH., Dec. 30—During the last quarter of 1915, the production and sales of the Hupp Motor Car Co. were 26 per cent better than during October, November and December, 1914. Orders on the books now for immediate delivery are 100 per cent greater than at this time a year ago, according to Commercial Manager Lee Anderson.

Daily Market Reports for the Past Week

Material	Tues.	Wed.	Thur.	Fri.	Sat	Mon.	Week's Ch'ge
Aluminum	.53	.53	.53	.53	.53	.53	...
Antimony	.39	.39	.39	.39	.39	.39	...
Beams and Channels, 100 lb.	2.07	2.07	2.07	2.07	2.07	2.07	...
Bessemer Steel, ton	32.00	32.00	32.00	32.00	32.00	33.00	+1.00
Copper, Elec., lb.	.21½	.22	.22½	.22½	.22½	.23	+ .01½
Copper, Lake, lb.	.21½	.22	.22½	.22½	.22½	.23	+ .01½
Cottonseed Oil, bbl.	8.49	8.50	8.54	8.54	8.60	8.70	+ .21
Cyanide Potash, lb.	.28	.28	.28	.28	.28	.28	...
Fish Oil, Menhaden, Brown	.48	.48	.48	.48	.48	.48	...
Gasoline, Auto, bbl.	.21	.21	.21	.21	.21	.21	...
Lard Oil, prime	.92	.92	.92	.92	.92	.92	...
Lead, 100 lb.	5.40	5.40	5.40	5.40	5.50	5.50	+ .10
Linseed Oil	.64	.65	.65	.65	.66	.66	+ .02
Open-Hearth Steel, ton	33.00	33.00	33.00	33.00	33.00	34.00	+1.00
Petroleum, bbl., Kansas, crude	1.20	1.20	1.20	1.20	1.20	1.20	...
Petroleum, bbl., Pennsylvania, crude	2.15	2.15	2.25	2.25	2.25	2.25	+ .10
Rapeseed Oil, refined	.96	.96	.96	.96	.96	.96	...
Rubber, Fine Up-River, Para	.82	.85	.87	.87	.87	.93	+ .11
Silk, raw, Italian	...	...	5.25	...	...	5.25	...
Silk, raw, Japan	...	...	4.67½	...	...	4.70	+ .02½
Sulphuric Acid, 60 Baume	1.50	1.50	1.50	1.50	1.50	1.50	...
Tin, 100 lb.	39.25	39.75	40.00	40.00	40.50	41.00	+ .75
Tire Scrap	.05½	.05½	.05½	.05½	.05½	.05½	...

Higher Prices for Materials

Para Rubber Reaches 96 Cents—Open-Hearth at $34 a Ton—Pa. Crude Rises to $2.25

NEW YORK CITY, Jan. 4—Steel, rubber, copper and lead prices last week reached new high marks. These four materials have seen a steady rise during the last few months. There is an unprecedented demand for these materials and it is expected that a further rise in prices will occur. Bessemer and open-hearth steel have reached $33 and $34 per ton, respectively. Sharp advances occurred in the crude rubber market both here and in London. Up-River fine was quoted at all the way from 93 cents to $1 a pound and first latex pale at $1.02 to $1.05. The rise of prices in rubber is at the present time of importance to the trade in general because of the pending general rise in tire prices. Copper last week rose from 21½ to 23 cents. The demand for copper continues large and sales at the high prices are limited. Lead was firm at $5.50 per 100 pounds.

An advance of 10 cents a barrel to $2.25 occurred last week in the price of Pennsylvania crude oil. Oil authorities expressed some hope that this latest rise would bring out stocks now in the hands of producers, which are badly needed by refineries because of the tremendous demand for oil for domestic and foreign use. As to what will develop with regard to the production of crude oil, nothing at the present time can be ascertained, but provided the ratio of decrease in supply to demand continues, the finding of a substitute for gasoline, it is said, will in the future be the only solution of the high price problem. Apropos of the present prices of gasoline, the question of using kerosene as a substitute for that fuel has been the cause of many experiments along that line. Europeans since the war have had their eyes opened to the adaptability of the American automobile engine to a low gravity gasoline. Some of the French makes of cars require 68 to 76 deg. gravity, whereas the American-made motors use 60 to 62 deg. gravity.

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Ajax Elects Directors

NEW YORK CITY, Dec. 31—The following directors of the Ajax Rubber Co. have been elected: Horace De Lisser, W. G. Grieb, H. W. Stimson, J. C. Matlack, L. P. Destribats, R. A. Patterson, H. K. Pritchitt.

—

Autocar Dividend of 5 Per Cent

ARDMORE, PA., Dec. 31—The directors of the Autocar company, this city, have

voted that a 5 per cent cash dividend be declared, payable to-day, to stockholders of record at the date of the meeting, the first cash dividend declared for a number of years. They also voted that $400,000 of their accumulated surplus be made permanent capital by issuing capital stock therefor. The capital of the company was increased on Oct. 14 from $1,000,000 to $2,000,000.

—

Lozier Motor Capital to Be $3,000,000?

DETROIT, MICH., Dec. 31—The Lozier Motor Co. has succeeded the Associated Lozier Purchasers, which was the name under which the purchasers of the assets of the old Lozier company had incorporated last year. It was stated at the offices of the Lozier company that the reorganized company will be incorporated some time in January and that the capital stock will be between $3,000,000 and $5,000,000.

—

Canadian Ford Dividend to Be Paid Jan. 8

FORD, ONT., Dec. 31—Stockholders of the Ford Motor Co. of Canada, Ltd., have been notified that the 600 per cent stock dividend recently declared will be paid to stockholders of record Jan. 8. From Jan. 8 to 12 the books of the company will be closed, and during that time old stock certificates must be surrendered.

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Regular Dividends Declared

Packard Motor Car Co.; cash dividend of 1¾ per cent and stock dividend of 10 per cent on common, payable Feb. 1.

Kelly-Springfield Tire Co.; quarterly of 3 per cent on common, payable Feb. 1 to stock of Jan. 15.

Tire Stocks Are Higher

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Firestone Common Rises 20 Points—Miller Rubber Common Shows 25-Point Gain

NEW YORK CITY, Jan. 4.—Activities in last week's securities were for the most part based on pre-dividend announcements. A number of the companies will hold directors' meetings this month to decide on dividends. A Goodrich meeting is scheduled for Jan. 26. It is expected in financial circles that a resumption of dividends on the common stock will be at a rate around 4 per cent. The Maxwell dividend on the first preferred disposes of the accumulation on the first preferred stock. The first preferred stock holders have the option to use their warrants in paying for new first preferred stock at par at any time on and after Jan. 3 and up to June 30, 1916. Ajax Rubber stockholders, it is stated, will not have to wait for dividends. During the present month the directors will declare the initial quarterly dividend of $1.25 a share on the new stock and dividends will be maintained regularly thereafter at the rate of $5 a share with frequent extra disbursements. This stock first appeared on the market several weeks ago at 65. It sold yesterday at 71¾.

The market yesterday showed strength under the test of evil news from the Mediterranean where much submarine warfare has been carried on lately. Much strength was shown in tire issues, especially in Miller Rubber, Firestone and Goodyear. Miller Rubber common went up 25 points, closing at 260; Firestone rose 20 points to 710, and Goodyear common went up 7 points to 342.

Maxwell first preferred closed Saturday at 92 and went up another point yesterday, making a gain of 11 points. Packard common went up 5 points and Peerless closed at 27 with a 7-point gain.

A number of the automobile stocks were lower last week. Reo Motor Car went down 35 points on the ex-dividend of 100 per cent. Willys-Overland common dropped 7 points to 232 and Studebaker common dropped 2½ points.

Quotations on the Detroit Exchange were lower, with the exception of General Motors common, which rose 32½ points to 460. Maxwell first preferred dropped 8½ points to 91, presumably on account of the payment of the dividend on that stock. Packard common closed at 185 with a 3-point loss. Studebaker common rose 2 points to 166½.

—

Recent Changes in Capitalization

FOSTORIA, OHIO, Dec. 31—The Allen Motor Co. has decreased its capital from $500,000 to $400,000.

AKRON, OHIO, Dec. 31—The Mohawk Rubber Co. has increased its capital from $250,000 to $500,000.

DETROIT, MICH., Dec. 31—Goodspeed-Detroit Mfg. Co., capital increased from $20,000 to $50,000.

NORTH DETROIT, MICH., Dec. 31—Russel Motor Axle Co., capital increased from $150,000 to $250,000.

DETROIT, MICH., Jan. 3—Morgan & Wright, capital stock increased from $5,000,000 to $5,600,000.

Automobile Securities Quotations on the New York and Detroit Exchanges

	1915 Bid	1915 Asked	1916 Bid	1916 Asked	Wk's Ch'ge
Ajax Rubber Co. (new)	..	..	71½	72	+1
Aluminum Castings pfd	95	100	..	..	..
J. I. Case pfd	..	..	87½	89	+4½
Chalmers Motor Co. com	..	88	130	150	..
Chalmers Motor Co. pfd	..	92½	101	103	..
Chevrolet Motor Co	..	..	130	132	+3
Electric Storage Battery Co	..	..	64	65	—1
Firestone Tire & Rubber Co. com	350	356	710	..	+20
Firestone Tire & Rubber Co. pfd	110	112	113½	..	+1½
General Motors Co. com	80	82½	490	500	—5
General Motors Co. pfd	85	91	114	115½	—3
B. F. Goodrich Co. com	24	25	74	75½	— ¾
B. F. Goodrich Co. pfd	92	94½	112	113½	..
Goodyear Tire & Rubber Co. com	188	191	342	345	+7
Goodyear Tire & Rubber Co. pfd	101	102½	114	115½	..
Gray & Davis, Inc., pfd	..	..	..	..	..
International Motor Co. com	..	..	25	30	—1
International Motor Co. pfd	..	..	45	50	—2
Kelly-Springfield Tire Co. com	69	71	{ 295 { † 74	300 75	—2 ..
Kelly-Springfield Tire Co. 1st pfd	75	79	94	96	—1
Kelly-Springfield Tire Co. 2d pfd	94	96	†74	75	..
Maxwell Motor Co. com	14⅜	15	74½	76	+1
Maxwell Motor Co. 1st pfd	42½	43½	92	94	+10
Maxwell Motor Co. 2d pfd	16¼	17	56	57	..
Miller Rubber Co. com	..	..	260	270	+25
Miller Rubber Co. pfd	..	..	113	115	+1
New Departure Mfg. Co. com	..	..	..	..	..
New Departure Mfg. Co. pfd	..	..	..	..	..
Packard Motor Car Co. com	..	100	185	192½	+5
**Packard Motor Car Co. pfd	90	..	101½	103½	— ½
Paige-Detroit Motor Car	..	..	..	700	..
Peerless Motor & Truck Corp	..	..	27	28	+7
Portage Rubber Co. com	25	30	70	72	..
Portage Rubber Co. pfd	80	85	102	105	+2
Regal Motor Co. pfd	..	..	..	22½	..
‡Reo Motor Truck Co	10½	11½	23	24	+ ½
‡‡Reo Motor Car Co	21¾	..	32	33	—35
Splitdorf Electric Co. pfd	..	..	..	..	..
Stewart-Warner Speed. Corp. com	51	52½	87	90	+1

	1914 Bid	1914 Asked	1915 Bid	1915 Asked	Wk's Ch'ge
Stewart-Warner Speed. Corp. pfd	99	101	108	..	..
Studebaker Corp. com	34¾	35¾	165	166	—2½
Studebaker Corp. pfd	90	91½	113	114	+ ½
Swinehart Tire & Rubber Co	69	70	89	90½	+2
Texas Company	..	..	230	232	—1
U. S. Rubber Co. com	52	56	57	58	—2
U. S. Rubber Co. 1st pfd	100	102	109	110	..
Vacuum Oil Co	..	..	230	235	—3
White Motor Co. (new)	..	..	51½	52	—1½
Willys-Overland Co. com	83	85	232	234	—7
Willys-Overland Co. pfd	92	94	111½	113	— ½
ACTIVE STOCKS					
Chalmers Motor Co. com	..	88	..	156	..
Chalmers Motor Co. pfd	..	92½	99	102½	..
Continental Motor Co. com	155	175	..	258	..
Continental Motor Co. pfd	..	..	91	94	..
Ford Motor Co. of Canada	445	480	..	410	..
General Motors Co. com	75	80	460	490	+32½
General Motors Co. pfd	88	92	114	116	—1
Maxwell Motor Co. com	13¾	14¾	74½	77½	+1¼
Maxwell Motor Co. 1st pfd	40½	43½	91	95	—8½
Maxwell Motor Co. 2d pfd	16	18	55	58	+1½
Packard Motor Car Co. com	..	100	185	192	—3
Packard Motor Car Co. pfd	90	..	104¼	105	+ ½
Paige-Detroit Motor Car Co	..	..	..	700	—10
‡Reo Motor Car Co	21½	..	32½	33½	..
‡‡Reo Motor Truck Co	10½	11½	23¼	23⅞	+1¼
Studebaker Corp. com	..	..	166½	169½	+2
Studebaker Corp. pfd	..	..	112	115	..
INACTIVE STOCKS					
§Atlas Drop Forge Co	..	25	28½	31	..
Kelsey Wheel Co	185	..	285	..	..
§W. K. Prudden Co	..	20	26¼	..	+2
Regal Motor Co. pfd	..	25	..	22½	..

*Old. †New. **And accrued dividends. ‡Par value $10; ex-dividend. ‡‡Par value $10; ex-dividend, 100 per cent. §Par value $10.

Boston Show Space Insufficient

May Have To Secure Another Hall—Chicago Show a Japanese Garden

BOSTON, MASS., Dec. 31—The officials of the Boston Automobile Dealers Association are faced with the alternative of either hiring an additional hall for the motor show or turning away applicants for space. At Boston a big share of space is taken by the truck dealers, and so that means the space that was available in the past when there were two distinct shows is allotted. Some of the passenger car men would like to have the trucks put in another hall, for they realize that to exhibit outside will hardly pay. The matter will be put up to the applicants and they can make the decision. If enough of them decide to go in the other hall will be engaged.

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Chicago Show a Japanese Garden

NEW YORK CITY, Dec. 31—Samuel A. Miles, general manager of Chicago Automobile Show to be held in the Coliseum and Armory, Jan. 22-29, announces that the decoration scheme in the Coliseum will be in the form of a Japanese garden. This scheme will be carried out by covering the entire ceiling with Japanese kiosks, together with Japanese lamps, etc., throughout the building.

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New Machinery for Duplex

CHARLOTTE, MICH., Dec. 31—More machinery is being added to the equipment of the Duplex Power Car Co. Further enlargements of the plant are also contemplated. Business on hand will keep the plant running to full capacity well into the new year.

—

Indianapolis Entry Blanks Out

INDIANAPOLIS, IND., Dec. 31—Entry blanks have been sent out for the 300-mile race to be held May 30 on the Indianapolis speedway. The purse for the race has been reduced from $50,000 to $30,000, the first prize $12,000. There will be ten prizes, the same as in former years.

—

New Cast-Steel Wheel

SYRACUSE, N. Y., Dec. 31—The Smith Wheel, Inc., of this city is shortly to produce a new form of cast-steel wheel especially for motor trucks. It is of the hollow one-piece type, with twelve spokes, like a wooden wheel, thus avoiding the odd appearance common to some steel wheels. Each spoke is a graceful smooth exterior oval, blending naturally with the felloe and hub. It is fitted with reinforcements in its cored-out interior and has no holes except the regular hub flange holes, which are standard, thus permitting the wheel to be interchangeable with standard wood wheels.

The wheel is made both for single and dual tires and is adapted to either pressed-on or demountable solid tires.

In tests it is claimed that the wheel was able to take a load of 30 tons in a horizontal direction before the wheel dished ¼ in., when with the pressure withdrawn, it sprang back into its normal shape. Individual spoke sections were also stressed up to 30 tons, it is stated, the wheel load being taken by six spokes three upper and three lower in practice.

—

Reo Refuses War Order for 1000 Motor Trucks

LANSING, MICH., Dec. 30—The Reo Motor Truck Co. was approached recently with regard to furnishing 1000 trucks to one of the European belligerent nations. R. C. Rueschaw, sales manager of the company, states that the order was not accepted because the Reo company is not looking for business from those countries at this time. The reason is that the domestic business of the Reo Motor Truck Co., has been increasing so rapidly that it has not been possible to take care of it as would have been desirable. To have accepted the foreign order would have been the cause of still greater disturbance in taking care of the American business.

—

A. C. A. Tests Four-in-One Heater

NEW YORK CITY, Jan. 3—The testing laboratory of the Automobile Club of America has made a series of tests to determine the effect of the Four-in-One heater, manufactured by the Continental Auto Heater Co., 18 E. Forty-first Street, New York, upon fuel consumption, power output and back pressure. It was found that while the power output and fuel consumption were unaffected, back pressure was reduced to a marked degree. With the heater valve open the back pressure was less than one-half of what it was without the heater attached, and with the heater valve closed the back pressure was less than without the heater in the line. The device is a radiator heated by exhaust gas.

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Dann Inserts Cost Less

CHICAGO, ILL., Jan. 1—Dann cushion spring inserts have been reduced in price, sets formerly selling for $8 now being priced at $5.70 each.

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Bosch Holds Annual Convention

NEW YORK CITY, Dec. 30—The Bosch Magneto Co. held its annual distributors' convention on Dec. 30, an all-day session being held in the offices of the company. After a morning session begun at 9.30, luncheon was served to the delegates at 1.00. Business was resumed after luncheon and the session continued until 7 o'clock. A banquet was served at Reisenweber's immediately afterward and the party disbanded to meet on Friday for a trip of inspection through the Springfield works.

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Bosch Adds Eighteen Concerns

NEW YORK CITY, Jan. 1—The Bosch Magneto Co., this city, has signed contracts with eighteen concerns in the automobile and commercial vehicle fields to use Bosch magnetos for the coming season, making a total of 176 closed during the past season. The eighteen new contracts are as follows:

Nordyke & Marmon Co....Indianapolis, Ind.
The Russell & Co.....Massillon, Ohio
Croce Automobile Co.....Asbury Park, N. J.
Bessemer Motor Truck Co....Grove City, Pa.
Harwood-Barley Mfg. Co.....Marion, Ind.
Diamond T Motor Car Co.....Chicago, Ill.
Krebs Commercial Car Co.....Clyde, Ohio
D. F. Poyer Co.....Menominee, Mich.
Service Motor Truck Co.....Wabash, Ind.
J. D. Fate Co.....Plymouth, Ohio
The New-Way Motor Co.....Lansing, Mich.
Signal Motor Truck Company..Detroit, Mich.
Zeitler & Lamson.....Chicago, Ill.
Walden W. Shaw Livery Co.....Chicago, Ill.
Winton Co.....Cleveland, Ohio
Transport Tractor Co.Long Island City, N. Y.
Old Reliable Motor Truck Co....Chicago, Ill.
Chester County Motor Co....Coatesville, Pa.

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Overland Factory Office for Seattle

SEATTLE, WASH., Jan. 1—The Willys-Overland Co. will establish a factory office in this city, controlling the territory of Washington, Oregon, Idaho, Montana and British Columbia. J. V. Hough will have charge of the office.

—

Cox Raises C-C Shock Absorber Price

NEW YORK CITY, Jan. 3—Increased cost of production due to improvements in design, material and workmanship are responsible for an increase in the price of the C-C heavy type shock absorber manufactured by the Cox Brass Mfg. Co., Albany, N. Y. The price is now $12 per set of four, as against the former price of $10 per set. The Ford type remains at $8 per set or $4.50 per pair.

—

Dinner Tendered to Kennerdell

NEW YORK CITY, Jan. 4—A complimentary dinner was tendered Richard Kennerdell last night at the Biltmore by President Wilson of the American Automobile Assn. and thirty of his associates on the contest board. Mr. Kennerdell was presented with a watch in recognition of his services as chairman of the committee.

—

Gets Crane-Simplex on Coast

NEW YORK CITY, Jan. 2—The Arnold-Stelling Co., Inc., has secured the Pacific Coast agency for the Crane model Simplex cars and will open representation in San Francisco at Hotel St. Francis, Feb. 1. A salesroom will be opened in March. In addition to the exclusive rights for the Pacific Coast, Arnold-Stel-

ling have all territory west of the Mississippi which is open at present. Jan H. Stelling, president, has been sales manager of the DeDion in New York for eight years, and Geo. K. Arnold, secretary, has been connected with the business in New York.

—

Anderson Electric Managers Meet

DETROIT, MICH., Dec. 31—The first annual convention of branch managers and road men of the Anderson Electric Car Co. was held here this week. Those in attendance reported this to have been the biggest year in history for electric passenger cars while prospects for next year are very encouraging. The Anderson company is planning a greatly increased production for 1916.

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Allen Banquet Celebrates Addition

FOSTORIA, OHIO, Jan. 3—By way of celebrating the completion of its new chassis assembly plant, the Allen Motor Co., last week entertained its employes and about 500 guests at a banquet. The new building increases the floorspace of the Allen company by 32,000 sq. ft. Following a program of entertainment, the gathering was addressed by E. W. Allen, who stated that the present capacity of the factory was eighteen cars per day and that this will be increased to fifty cars by March 1. Others who spoke at the gathering were S. M. Hopkins, W. O. Allen, Judge George Schroth and J. P. Hunting.

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Eisemann Magnetos Exclusively on 1916 Pierce-Arrow Trucks

BUFFALO, N. Y., Dec. 31—For the coming year, the 3-ton Pierce-Arrow trucks will use exclusively Eisemann magneto type EM4 dual and Eisemann coil type DCR. The Pierce-Arrow 2-ton trucks will use exclusively Eisemann magneto waterproof type G4. Deliveries will begin in February.

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White Adopts Eisemann Magneto

NEW YORK CITY, Jan. 1—The Eisemann Magneto Co. will begin deliveries in January on a contract made some months ago, of the Eisemann type G 4 magneto to the White Motor Co., Cleveland, Ohio, which has adopted this magneto as standard equipment for all its trucks.

—

Doehler Die Casting to Add

TOLEDO, OHIO, Dec. 31—The Doehler Die Casting Co. is planning to build factory structures estimated to cost $69,514. Three buildings are planned in the 1900 block, on Smead Avenue. All are to be of steel, concrete and brick. One building, estimated to cost $42,746.77 will consist of two stories and a basement, and will be 50 ft. wide by 260 ft. long. A new foundry will cost $8,922 and will be one story and a basement, 50 by 180 ft. The third building, a warehouse, 50 by 160 ft., will cost $17,844.82, and will be one story, with basement.

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Toledo Machine Sold to N. Y. Interests

TOLEDO, OHIO, Dec. 31—The Toledo Machine & Tool Co. has been bought by Hoit, McWilliam & Co. of New York for clients. The company is capitalized at $6,000,000, the stock having been increased through the distribution of a 400 per cent stock dividend. The company has specialized in the manufacture of machinery for making sheet metal products.

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Mich. Hearse & Motor Co. Reorganized

GRAND RAPIDS, MICH., Dec. 31—The Michigan Hearse & Motor Co. has been reorganized. Walter Ioor has been elected president, succeeding Alvah W. Brown. Mark Norris is vice-president; A. C. Chapman is secretary and sales manager and E. W. Aumeal, general manager. The factory has been enlarged through a three-story addition, 40 by 100 ft.

Proposed Eighth Report of Iron and Steel Division

(*Continued from page* 23)

(c) Tension and bend test specimens for plates and shapes shall be of the full thickness of material as rolled; and may be machined to the form and dimensions shown in Fig. 1 (see proof for sheet 15a of Vol. I of Handbook) or with both edges parallel.

(d) Tension and bend test specimens for rolled bars and forgings of uniform cross-section 1½ in. or less in thickness or diameter, may be of the full-size section of material as rolled or forged, or may be machined for a length of at least 9 in., in which case the gage length shall be 8 in. Tension test specimens should preferably be of the S. A. E. standard form as illustrated in Fig. 2 (See proof for sheet 15xa of Vol. I of Handbook).

(e) The axis of tension and bend test specimens for rolled bars and forgings of uniform cross-section over 1½ in. thickness or diameter, and for forgings of irregular sections, when practicable, shall be located at any point midway between the center and surface when solid, and at any point midway between the inner and outer surfaces of the wall when bored, and shall be parallel to the axis of the piece in the direction in which the metal is most drawn out. Tension test specimens shall be of the form and dimensions shown in Fig. 2. Bend test specimens shall be ½ in. square in section with corners rounded to a radius not over 1/16 in., and need not exceed 6 in. in length.

Number of Tests

13 (a) Unless otherwise specified by the purchaser, one tension and one bend test shall be made from each melt; except that if material rolled from one melt differs ⅜ in. or more in thickness, one tension and one bend test shall be made from both the thickest and the thinnest material.

(b) If any test specimen shows defective machining or develops flaws, it may be discarded; in which case the manufacturer and the purchaser or his representative shall agree upon the selection of another specimen in its stead.

(c) If the percentage of elongation of any tension test specimen is less than that specified and any part of the fracture is more than ¾ in. from the center of the gage length of a 2 in. specimen or is outside the middle third of the gage length of an 8 in. specimen, as indicated by scribe scratches marked on the specimen before testing, a retest shall be allowed.

Finish

14. The material shall be free from injurious defects and shall have a workmanlike finish.

Inspection and Rejection

Inspection

15. (a) The inspector representing the purchaser shall have free entry, at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the material ordered. The manufacturer shall afford the inspector, free of cost, all reasonable facilities to satisfy him that the material is being furnished in accordance with these specifications. Tests and inspection at the place of manufacture shall be made prior to shipment.

(b) The purchaser may make the tests to govern the ac-

ceptance or rejection of the material in his own laboratory or elsewhere. Such tests, however, shall be made at the expense of the purchaser.

(c) All tests and inspection shall be so conducted as not to interfere unnecessarily with the operation of the works.

Rejection

(a) Unless otherwise specified, any rejection based on tests made in accordance with Section 15 (b) shall be reported within ten working days from the receipt of samples.

(b) Material which shows injurious defects while being finished by the purchaser will be rejected, and the manufacturer shall be notified.

Rehearing

17. Samples rejected in accordance with Section 15 (b) shall be preserved for one month from the date of the test report. In case of dissatisfaction with the results of the tests, the manufacturer may make claim for a rehearing within that time.

Regarding Specifications, and Notes and Instructions

The notes and instructions following the Specifications given above are not to be considered in any way a part of these Specifications. They are added solely for the information of the user of the steels and the guidance of the purchaser in the selection of proper materials for his different purposes. They should not be incorporated in the Specifications when ordering steel except under such conditions as are imposed in the Specifications themselves.

(End of Seventh Report Revision)

Standard Test Specimens

Shock Test

It is recommended that the 10 by 10 mm. test piece 40 mm. long with notch 2 mm. deep and 1 mm. wide be adopted as the standard specimen for shock test. The bottom of the notch is to be of 0.5 mm. radius, smooth and free from scratches. (See proof of sheet 15xb of Vol. I of Handbook).

Flat Tension Specimen

It is recommended that we adopt the standard flat strip test specimen of the American Society for Testing Materials. The gage width of specimens ¼ in. or less in thickness should be equal to five times the thickness, except that in no case shall the width be less than ¾ in. The gage length should equal twenty-four times the thickness of the specimen, except that in no case shall it be less than 2 in. (See proof of sheet 15xa of Vol. I. of Handbook).

It is recommended that our present flat tension test specimen be called recommended practice for use in cases where the standard specimen cannot be made. (See proof of sheet 15a of Vol. I of Handbook).

Alternating Stress Specimen

The removal of the present alternating stress test specimen (see sheet 15b of Vol. 1 of Handbook) from the list of standards is recommended as it is very little used in its present form.

Gray Iron Specimens

It is recommended that the A. S. T. M. gray iron specimens be adopted as standard of the S. A. E. (See sheet 15c of Vol. I of Handbook).

Finish on Standard Specimen

It is recommended that instructions be appended to the present standard 2 in. tension test specimen, calling for finished lapping or grinding of the gage length. (See proof of sheet 15 of Vol. I of Handbook).

Brinell Test

It is recommended that instructions for the Brinell test, based upon the recommended practice of the A. S. T. M. (See proof of sheet 15xd of Vol. I of Handbook) be published as the standard method of this Society.

"Temper" of Sheets and Tubing

A sub-committee constituted of Messrs. Johnson and Zimmerschied were appointed to investigate the advisability of establishing standard practice or nomenclature relating to the various "tempers" or physical conditions of sheet steel and seamless drawn tubing.

Standard Color

A sub-committee consisting of Messrs. Rys, Johnson and Trabold was appointed to investigate the feasibility of establishing a scale of standard colors for painting each of the various grades of S. A. E. carbon steels, it being recognized that the alloy steel grades are too numerous to lend themselves to a suffciently simple scheme of designation by colors.

Bakelite—A Synthetic Resin

(*Continued from page* 36)

pared in the form of a dry, granular powder or sometimes in thin, hard sheets which soften readily on being slightly heated so that they can be cut or otherwise manipulated for loading the dies.

The first application of heat and pressure applied to this material has the effect of momentarily softening it so that it fluxes freely, taking accurately the form of the mold. The continued application of heat and pressure brings about a chemical reaction which causes it rapidly to harden or "set," into a solid homogeneous mass, after which it cannot be softened again by further heating. The time of this "cure" will vary from 5 to 8 min., depending upon the size of the piece. The work comes finished from the die, excepting for a slight "fin" where the halves of the die come together, which has to be dressed off. Bakelite parts can be molded with great accuracy and will take a high molding finish. Metal inserts can also be readily molded in the material, which in many cases reduces the item of assembly costs.

The great flexibility in the properties which finished Bakelite may have is largely responsible for its extended use. Bakelite can be made to combine many different groups of essential or desirable properties. It is also made as a liquid or varnish in which form it is largely used for impregnating armature and other coils. In a somewhat modified form it is also used as a lacquer and protective enamel which can be applied by dipping, brushing or spraying. It differs essentially from other insulating compounds used for impregnating armature coils. When subjected to heat, Bakelite hardens, whereas most other compounds soften. After hardening, Bakelite has no melting point, but at temperatures in excess of 575 deg. F. it gradually carbonizes and disintegrates. Bakelite impregnating material bonds wires into a solid mass, preventing abrasive friction. It facilitates the dissipation of heat from the interior of the coils so much more rapidly than ordinary insulating compound that there is little danger from burnouts.

Bakelite micarta and dilecta are trade names for a material built up of laminations of paper coated and impregnated with Bakelite. These materials have qualifications which render them superior to fiber.

While there is as yet no accepted standard test piece or test method for measuring dielectric strength, the product as applied to automobile use will have a resistance of 250 to 300 volts per mil. Other properties are specific gravity, 1.33, temperature resistance 250 to 300 deg. F., and tensile strength of 4000 to 4500 lb. per sq. in.

Factory Miscellany

Hyatt Top to Establish Plant—The Hyatt Auto Top Co., Trenton, N. J., will establish a plant on Wood Street, Trenton.

Columbia Truck Will Build—The Columbia Motor Truck & Trailer Co., Pontiac, Mich., will build a plant 60 by 200 ft. at Pontiac.

Brockway Truck to Build—The Brockway Motor Truck Co., Corning, N. Y., is taking bids for its factory, which will be 40 by 186 ft., two stories.

Perfection Oiler to Build—The Perfection Automobile Oiler Co., Seattle, Wash., will build a plant to manufacture its devices. This concern was recently incorporated with $100,000 capital stock.

Beaver Motor Adds—The Beaver Motor Car Co., Gresham, Ore., will construct an addition to its factory, 32 by 70 ft., to be used as a foundry. It will be equipped with the latest type of machinery.

Pierce-Arrow to Build Laboratory—The Pierce-Arrow Motor Car Co., Buffalo, N. Y., has let contract for the erection of a laboratory and experimental building, 50 by 90 ft., two stories, at its plant at Elmwood Avenue and New York Central Railroad Line.

Akron Double Tread Adds—The Akron Double Tread & Tire Co., Jefferson Avenue, Akron, Ohio, contemplates constructing a two-story reinforced concrete, brick and steel factory addition to cost $30,000. No details decided.

Schacht Truck Moves Plant—The G. A. Schacht Motor Truck Co., Cincinnati, is moving its plant from Spring Grove Avenue to the manufacturing building at Gest and Evans streets. It will increase its manufacturing facilities.

Mutual Wheel to Add—The Mutual Wheel Co., Third Avenue and Sixth Street, Moline, Ill., has taken out a permit to build a four-story building to cost $10,000. It will be of brick, and will be used for the manufacture of automobile wheels. The company has been making wagon and buggy wheels.

Milwaukee Engine Co. Adds—The Milwaukee Auto Engine & Supply Co., 708 Winnebago Street, Milwaukee, Wis., has awarded contracts for the erection of its new factory at Twenty-eighth Street and Meinecka Avenue. The building will be of brick and steel construction, fireproof, one and two stories high, 60 by 120 ft. in size and contains an electric elevator.

Frome Co. Adds—The R. L. Frome Mfg. Co., box manufacturer, Howard's Grove, Wis., plans to manufacture motor trucks on a small scale. A 36 by 38-ft. addition is being made to the plant, to accommodate experimental work. The company plans to be ready to start production in March.

St. Albans Buildings Leased—The old buildings of the St. Albans Foundry & Implement Co., St. Albans, Vt., have been leased to the Foundry, Motor Car & Manufacturing Co., representing several St. Albans interests, and will be used for the carrying on of a general automobile business as well as manufacturing and general machine work.

To Make Tops—The Consolidated Auto Top Co., Detroit, Mich., has been organized and incorporated, its capital stock being $10,000, to make automobile tops. The incorporators of the new concern are C. P. Sieder, formerly president of the Sieder Mfg. Co.; L. N. Gay, formerly manager of the American Top Co., and H. R. Bidwell, formerly foreman of the American Top Co.

The Automobile Calendar

Dec. 31-Jan. 8....New York City, Sixteenth Annual National Automobile Show; Grand Central Palace; N.A.C.C.

1916

Jan. 5-6.....New York City, S. A. E. Winter Session, Standards Committee Meeting.

Jan. 7, 8, 10, 11...New York City Convention National Assn. of Automobile Accessory Jobbers.

Jan. 7-13.....Milwaukee, Wis., Show, Auditorium.

Jan. 8-15.....Cleveland, Ohio, Show, Wigmore Coliseum, Cleveland Automobile Show Co.

Jan. 8-15.....Philadelphia, Pa., Show, Philadelphia Auto Trade Assn.

Jan. 13-18.....Columbus, Ohio, Show, Memorial Hall, Columbus Automobile Club and Columbus Auto Trades Assn.

Jan. 14-22.....Dayton, O., Show, Delco Bldg., Dayton Automobile Dealers' Assn., and Dayton Accessory Dealers' Assn.

Jan. 10-15.....Fort Wayne, Ind., Show, Auto Trade Assn.

Jan. 10-15.....New Bedford, Mass., Show, State Armory.

Jan. 15-22.....Detroit, Mich., Show, Detroit Automobile Dealers' Assn.

Jan. 17-22.....Rochester, N.Y., Show, Exposition Park, C. A. Simmons, Mgr.

Jan. 17-22.....Wilmington, Del., Show, Wilmington Automobile Show Assn.

Jan. 18-21.....Fargo, N. D., Show, North Dakota and Minnesota Automobile Dealers' Assn.

Jan. 18-22.....Baltimore, Md., Show, Fifth Regiment Armory.

Jan. 18-22.....Lancaster, Pa., Show, Conestoga Park Pavilion.

Jan. 22-29.....Montreal, Que., Show, Almy's Bldg., Automobile Trade Assn., Ltd.

Jan. 22-29.....Chicago, Ill., Show, National Automobile Chamber of Commerce; Coliseum and First Regiment Armory.

Jan. 24-30.....Portland, Ore., Show, Armory, Portland Automobile Dealers' Trade Assn.

Jan. 24-29.....Buffalo, N. Y., Show, Buffalo Automobile Dealers' Assn., Broadway Auditorium.

Jan. 29-Feb. 5....Columbus, Ohio, Show, Memorial Hall, Columbus Automobile Show Co.

Jan. 29-Feb. 5....Minneapolis, Minn., Show, National Guard Armory, Minneapolis Trade Assn.

Feb. 1-3.....Frederick, Md., Show, Armory.

Feb. 2-5.....Poughkeepsie, N. Y., Show, State Armory.

Feb. 7-12.....Kansas City, Mo., Show, J. I. Case T. M. Bldg., Kansas City Motor Dealers' Assn.

Feb. 8-11.....Grand Forks, N. D., Show, Auditorium.

Feb. 9-12.....Peoria, Ill., Show, Coliseum, Peoria Automobile and Accessory Assn.

Feb. 12-19.....Hartford, Conn., Show, First Regiment Armory, Hartford Automobile Dealers' Assn.

Feb. 14-19.....Des Moines, Ia., Show, Des Moines Auto. Dealers' Assn.

Feb. 14-19.....Winnipeg, Man., Show, Ford Plant, Winnipeg Motor Trades Assn.

Feb. 19.....Newark, N. J., Show.

Feb. 20-27.....Grand Rapids, Mich., Show, Klingman Furniture Exhibition Bldg., Automobile Business Assn.

Feb. 21-26.....Louisville, Ky., Show, First Regiment Armory.

Feb. 21-26.....Omaha, Neb., Show, Omaha Automobile Show Assn.

Feb. 21-26.....Portland, Me., Show, Exposition Bldg.

Feb. 21-26.....Syracuse, N. Y., Show, Syracuse Automobile Dealers.

Feb. 28-Mar. 3....Pittsburgh, Pa., Convention of American Road Builders' Assn., Mechanical Hall.

Feb. 29-Mar. 4....Ft. Dodge, Ia., Show, Terminal Bldg., Ft. Dodge Automobile Dealers' Assn.

March 4-11.....Boston, Mass., Car and Truck Show, Mechanics Bldg.

Mar. 8-11.....Mason City, Ia., Show, Armory.

Mar. 21-25.....Deadwood, S. D., Show, Auditorium, Deadwood Business Club.

Mar. 28-Apr. 3....Manchester, N. H., Show, Under Auspices Couture Bros, Academy.

May 13.....New York City, Vanderbilt Cup, Sheepshead Bay Speedway Race.

May 20.....Chicago, Ill., Amateur Drivers' Race, Chicago Motor Speedway.

May 30.....Indianapolis Track Race.

June 17.....Chicago Track Race.

June 28.....Des Moines, Ia., Track Race.

July 4.....Minneapolis Track Race.

July 4.....Sioux City Track Race.

July 15.....Omaha, Neb., Track Race.

Aug. 5.....Tacoma Track Race.

Aug. 18-19.....Elgin Road Race.

Sept. 4.....Des Moines Track Meet.

Sept. 15.....Indianapolis Track Race.

Sept. 16.....Providence Track Race.

Sept. 30.....New York City Sheepshead Bay Race.

Oct. 7.....Omaha Track Race.

Oct. 14.....Chicago Track Race.

The Week in the Industry

Tracy Promoted—R. B. Tracy, formerly central manager of the Michelin Tire Co., Milltown, N. J., is now factory representative.

Mead Heads Vermont Firm—B. E. Mead has been appointed manager of the Vermont Auto Sales Co., Brattleboro, Vt., Chalmers agent. He was previously with Manley Bros., Vermont agents for the Hudson.

Middleton Succeeds DeWitt—R. T. Middleton has succeeded Frank DeWitt as Michigan representative and manager of the Steel Products Co. branch office in Cleveland, Ohio. Mr. Middleton has been the company's Central Western States' representative.

Neill G. M. Truck Mgr.—H. A. Neill has been appointed manager of the Kansas City, Mo., branch of the General Motors Truck Co., to succeed Estel Scott, who recently resigned as the result of ill health. Mr. Neill was district representative of the company in Atlanta.

Suess Assumes Duties—J. B. Suess, who succeeded Don Johnson as manager of the San Francisco branch of the Stewart Warner Corp., has assumed his duties. Mr. Suess formerly managed the company's branch in Kansas City.

Vedder Makes Change—E. G. Vedder has been made salesmanager for the Gray Motor Co., Minneapolis, Minn., Studebaker dealer. R. A. Briggs has been sent over to the St. Paul branch, which has been established in a new building at Franklin and Ninth Streets, to take Mr. Vedder's place as manager there.

Reed Succeeds Murray—M. E. Murray, who was recently appointed assistant general manager of the Republic Rubber Co. of Youngstown, Ohio, has been succeeded as president of the Republic Rubber Co. of California, the Pacific Coast branch of the Youngstown factory, by Irwin Reed. The latter was formerly manager of the Los Angeles branch.

New McGraw Tire Mgrs.—The McGraw Tire & Rubber Co., East Palestine, Ohio, has established truck tire branches in Buffalo, Detroit and Kansas City. G. J. Marshall will manage the Buffalo department; the Detroit branch is in charge of G. W. Tiffany, with headquarters in the Dime Savings Bank Bldg., and the service station at 26 Franklin Street; and the Kansas City department is under management of C. H. Connelly, who also has charge of the pneumatic sales in that territory.

Motor Men in New Roles

McClellan Tire Agent—J. R. McClellan has been named manufacturer and sales agent in Philadelphia for the McClellan tire, with headquarters at 817 North Broad Street.

Brebner Maxwell's New Castle Superintendent—Frankl Brebner has been appointed general superintendent of the Maxwell Motor Co. plant in New Castle, Ind. He succeeds W. B. Jameson.

Mayl Firestone Memphis Mgr.—J. E. Mayl, formerly sales manager of the St. Louis branch of the Firestone Tire Co., has been appointed branch manager for the same company at Memphis, Tenn.

Bartling Makes Change—E. F. Bartling, formerly general manager of the Auto Tire Sales Co., St. Louis, has become connected with the Nat L. McGuire Oil & Supply Co., 2924 Locust Street, St. Louis.

U. S. Tire Changes—Tom Wilkinson has been appointed manager of the San Francisco branch of the United States Tire Co., New York City, succeeding W. B. Rigdon, who goes to the Boston branch.

Damon Heads Boston Hollier—H. A. Damon, formerly sales manager of the New England agency for Michigan cars, with headquarters at Boston, Mass., has been placed in charge of the sales of the Hollier Motor Car Co.

Davis Heads Portland McGraw Tire—C. E. Davis of Portland, Ore., has been appointed manager of the Portland, Ore., branch of the McGraw Tire & Rubber Co., which has established quarters at 344-348 Burnside Street.

Brandt Makes Cleveland Connection—J. A. Brandt, formerly with the Quaker Tire & Rubber Co., has been appointed manager of the Euclid Avenue branch of the Collister & Sayle Co., automobile accessories and supplies, at Cleveland, Ohio.

Topken in Tacoma—F. W. Topken, A.S.M.E., for 11 years chief designing engineer of the Chicago Pneumatic Tool Co., is now in complete charge of the mechanical and garage departments of the Hunter-Smith Sales Co., Tacoma, Wash.

Schaeffer Enters Motor Field—L. P. Schaeffer of Seattle, Wash., and for many years a well-known figure in banking circles, has joined the automobile merchandisers in that city and has become vice-president and manager of the William T. Patten Motor Car Co., distributer of Hupmobiles in Seattle and King County, Washington.

Raymond Heads Columbus Concern—The Brasher Motor Car Co., Gay and Fourth Streets, Columbus, Ohio, has made H. G. Raymond manager of the concern. H. L. Taylor will continue in the same capacity as assistant to the manager.

Riley Resigns—N. S. Riley, manager of the Studebaker automobile branch at Kansas City, Mo., has tendered his resignation. Mr. Riley was formerly connected with the vehicle department.

Ford Joins Stackpole Carbon—D. E. Ford has been made sales manager for the new Twin City branch of the Stackpole Carbon Co., with temporary quarters at 133 Hennepin Avenue. The Twin Cities have been put on a free delivery basis and a battery factory is to be built in Minneapolis.

Roberts Goes to St. Louis—H. J. Roberts, formerly with the Hudson and Chalmers companies in Detroit has been appointed sales manager of the George C. Brinkman Motor Car Co. of St. Louis, Maxwell distributers in eastern Missouri and southern Illinois.

Dr. Treat Joins G. M.—Dr. D. L. Treat, who was president of the National Bank of Commerce of Adrian, Mich., resigned to become head of the new welfare department of the General Motors Co. In this new institution Dr. Treat will not only supervise the hospital and medical work, but under his direction will be the educational work, the promotion of moral and sanitary work, the health department and many other works and departments, all having some relation to general welfare.

Firestone Appoints District Managers—The Firestone Tire & Rubber Co., Akron, Ohio, announces the appointment of three district managers, who will have headquarters at the home office and at the same time will work closely with the sales organization in the field.

D. C. Swander, formerly branch manager at New York City, will have charge of the Eastern district. He will be succeeded in New York by C. D. Studebaker, who becomes branch manager. E. W. BeSaw, formerly Des Moines branch manager, will look after the Western branches. G. A. Spohr, former salesman, succeeds Mr. BeSaw as Des Moines manager. N. B. Burwell of the home office sales department will take care of the South.

Trade News from the Southwest—The El Paso Rubber Co., El Paso, Tex., has moved into new quarters at 205 West San Antonio Street. A full line of Quaker, Goodrich, Diamond and United States tires is carried.

Mansfield & Condron are now handling the Simplex trailer at Tucson, Ariz.

R. W. Koerner, factory representative of the Ajax-Grieb Rubber Co., will shortly arrange for the opening of a branch in Phoenix, Ariz. Ajax tires have been handled there for the last year by Peters & Pemberton.

W. R. Edison recently purchased the Mission garage, El Paso, Tex., and has decided to do a straight garage business hereafter. In line with this policy he has relinquished the agencies for Chevrolet and Cole cars and Ajax tires. The Chevrolet is to be handled in El Paso territory by the Myers Motor Co., with Guy Watts as sales manager.

A. E. Culbertson, formerly of Phoenix, is now sales manager for the D. L. Meloy Motor Co. at Globe and Miami, Ariz. He is devoting most of his time to the sale of Studebakers. E. L. Meloy, Jr., is handling Chevrolets for the firm.

The Goodyear Rubber Co. has opened a branch at Phoenix, Ariz. Temporary quarters have been secured at 133 North Central Avenue. The new building was ready for occupancy Jan. 1. H. T. Roseland, formerly of Syracuse, N. Y., is manager.

Dodge Bros. Add Shop—Dodge Bros., Detroit, Mich., are erecting a press and die shop, four stories.

Kansas City Items—The Hudson-Brace Motor Co., 1717 McGee Street, Kansas City, Mo., has doubled its space by constructing a new one-story building extending back to Oak Street. The company is the distributor of the Hudson car in the Kansas City territory.

Bruening Bros. Auto Co., 1712 Grand Avenue, will move into the quarters now occupied by the Studebaker Corp. at 162 Grand Avenue. The Studebaker company will move into a new five-story building at Twenty-first Street and Grand Avenue. Bruening Bros are distributors for the Apperson and KisselKar.

Seattle Trade Happenings—The Federal Rubber Mfg. Co., Milwaukee, Wis., has opened a direct factory branch in Seattle, Wash., to supply the trade in this city and the Northwest territory. A spacious location at 1921 Fifth Avenue has been obtained. F. B. Bloom, who is well known in the tire business on the Pacific Coast, is in charge of the branch.

Construction of a two-story building at the corner of East Pine Street and Bellevue Avenue, to be occupied by motor car, repair shops and body painters, has been begun, and the structure will be ready for occupancy by Feb. 1. It will be the new home of G. L. Trotter, agent for Reo and Stewart trucks and Stearns-Knight cars; R. S. Taylor, machine shops, and Pike & Lind, automobile body painters. The building is completely electrified, even to the heating system.

New Simms Stations—The following concerns have been appointed service stations for Simms magnetos and Simms-Huff electric starting and lighting systems. They are prepared to give factory service and prices, as well as guarantee work: Panhandle Motor Co., 604 Polk Street, Amarillo, Tex.; E. H. Odom Bros. Co., 43 Ivy Street, Atlanta, Ga.; Dallas Magneto & Starter Co., 529 S. Ervay Street, Dallas, Tex.; Edwards-Sutton Specialty Co., Armory Bldg., Sixth and Canal Streets, Dayton, Ohio; Denver Auto Goods Co., 1600 Broadway, Denver, Colo.; Kelley Hardware Co., 118 W. Superior Street, Duluth, Minn.; Indiana Electrical Service Co., 419 N. Capitol Avenue, Indianapolis, Ind.; Reinhard Bros. Co., Minneapolis, Minn.; Essex Storage Battery & Supply Co., 272 Halsey Street, Newark, N. J., and Ignition Specialties Co., 798 Seventh Avenue, New York, N. Y.

New Willard Stations—The Willard Storage Battery Co., Cleveland, Ohio, has brought the number from 500 to nearly 600 within a few months. There are now 579 Willard stations, as a result of the adding of the following: I. Lesses, Kingston, Ont.; W. J. Patton, Portsmouth, Ohio; Wolverton Electric Co., Lawton, Okla.; Chillicothe Battery & Supply Co., Chillicothe, Mo.; Miller & Reed, Clay Center, Kans.; Dodge City Vulcanizing & Storage Battery Station, Dodge City, Kans.; Ray Ryan Electric Co., Pittsburgh, Kans.; Albert Lea Storage Battery Co., Albert Lea, Minn.; F. J. Barnes, Blue Earth, Minn.; Nelson Auto Company, Benson, Minn.; National Garage, Crookston, Minn.; W. H. & Webster Jones Co., Brattleboro, Vt.; David City Battery Service Station, David City, Neb.; The Hanford Garage, Hanford, Cal.; Lounsbury & Shaffer, Merced, Cal.; Bogles Electrical Works, San Rafael, Cal., and the Electric Garage, Tulare, Cal.

Seattle Overland to Enlarge—Nine hundred thousand dollars in improvements is to be spent within the next few months by the J. W. Leavitt Co., Seattle, Wash., Pacific Coast distributor of the Willys-Overland Co., in enlarging and bettering the facilities of the firm's branches.

Ground has been purchased in San Francisco at the corner of Van Ness Avenue and Bush Street, upon which will be erected a building costing $400,000, which, it is declared, will be the finest automobile building in the world. The Los Angeles branch is to be improved to the extent of $250,000; Pasadena, $50,000; Oakland, $60,000; Sacramento, $100,000. These new structures, along with the recently completed buildings in Seattle and Portland, will give the Leavitt corporation a total of 436,500 ft. of floor space devoted to the sale, storage and mechanical service shops of Overland cars.

Late Illinois Items—A new garage and sales agency will shortly be opened in Havana, Ill. R. O. Curless of Peoria, is to be the proprietor. He has leased the vacant building of the J. B. Smith Manufacturing Co. on South Water Street, at the corner of Jefferson Street. C. P. Schmidt has been engaged to look after the mechanical and service department. The new firm is to be known as the Havana Auto Co. The Reo car will be handled at the outset and others may be taken on later.

The Auto Tire Boot Co., Chicago, has been incorporated with a capital stock of $2,500, to manufacture and deal in automobile supplies, parts and accessories. The promoters are Samuel Dulsky, Louis Dulsky, and Hanna Schooler.

The Mendota, Ill., Auto Co. has been incorporated with capital stock of $50,000 to deal in automobiles, motors and gasoline engines. The incorporators are John Goebel, August Goebel and V. C. Schaller.

A new service and assembling plant for the Pinkerton Motor Co., distributor of Ford cars, was opened in Pekin, Ill., on Jan. 1. L. J. Malone will be the manager. Ten machinists will be employed in assembling the cars after shipment from the factory.

The firm of McClure & Slingoff, for several years engaged in handling automobiles and supplies in Arrowsmith, Ill., has moved to 217 East Front Street, Bloomington, Ill., and will handle the Velie and Interstate cars.

Recent Baltimore Trade News—The Monumental Motor Car Co., agent for the Kissel, with temporary quarters at Howard and Franklin Streets, Baltimore, Md., has opened a service station at 504 St. Paul Street.

The Storage Battery Service Co., Inc., has opened for business at 1014 Morton Street, Baltimore, Md.

The Auto Supply Co., T. G. Young, president, 217 West Saratoga Street, Baltimore, Md., has taken the agency for Maryland for Wonder Mist, manufactured by the Wonder Mist Co., Boston, Mass.

Tabernacle Garage in York—A tabernacle converted into a garage is the latest plan of the J. W. Richley Automobile Co., 237 East Philadelphia Street, York. The company this week purchased the spacious tabernacle on the old reservoir lot, South Queen Street. The building will be used by the automobile concern for storage purposes and to display automobiles. Mr. Richley has the agency for the Ford, Buick and Hudson cars.

New Agencies Recently Established

Canada

Quebec	Overland	Eug. Julien & Co., Ltd

Colorado

Denver	Mitchell	Maines-Hough Motor Co.
Denver	Kissel	J. M. Patrick
Denver	Kissel Kar	J. M. Patrick
Denver	Enger	Colorado Carter Co.
Denver	Enger	Colorado Cartercar Co.
Denver	Kissel	J. M. Patrick
Littleton	Maxwell	Arapahoe Garage
Littleton	Saxon	Arapahoe Garage

Connecticut

New Haven	Vim	Kirk's Garage
Unionville	Oldsmobile	Tunxie Garage Co.

Delaware

Wilmington	National	Mecca Garage
Wilmington	Brockway	Cahill & Co.

Iowa

Avoca	Oldsmobile	Avoca Auto Supply Co.
Des Moines	Maxwell	Brown Motor Car Co.
Elk Horn	Apperson	Esbeck & Pederson
Fort Dodge	Franklin	Edward Awe
Jefferson	Apperson	G. W. Flack
Keokuk	Vim	W. B. Daniel
Marshalltown	Apperson	Geo. L. Pitcher
Pella	Apperson	CanDuren & Kruseman

Idaho

Filer	Apperson	Beem & Hammerquist
Ilo	Mitchell	Star Hardware Co.
Juliatta	Saxon	Carl Porter
Lewiston	Saxon	Harold Dishon
Lewiston	Mitchell	Erb Hardware Co.
Moeller	Mitchell	Harley Braman
Moscow	Saxon	H. H. Simpson
Pocatello	KisselKar	Mooney & Douglass
Potlatch	Mitchell	Potlatch Mercantile Co.
Wallace	Saxon	Bedard & Lunacker

Illinois

Alton	Saxon	Alton Garage
Alton	Paige	Alton Garage
Alton	Premier	Alton Garage
Belleville	Saxon	A. J. Stoeckel
Belleville	Paige	A. J. Stoeckel
Belleville	Premier	A. J. Stoeckel
Benson	Oakland	Vogel Bros.
Bloomington	Franklin	J. and G. Simpson
Bridgeport	Saxon	Home Garage
Bridgeport	Paige	Home Garage
Bridgeport	Premier	Home Garage
Carlinville	Saxon	H. C. Daley
Carlinville	Paige	H. C. Daley
Carlinville	Premier	H. C. Daley
Carrollton	Saxon	Curnett & Shepard
Carrollton	Paige	Curnett & Shaperd
Carrollton	Premier	Curnett & Shepard
Centralia	Saxon	W. F. Litsinberger
Centralia	Paige	W. F. Litsinberger
Centralia	Premier	W. F. Litsinberger
Chester	Saxon	Chester Saxon Co.
Chester	Paige	Chester Saxon Co.
Chester	Premier	Chester Saxon Co.
Chenoa	Dodge	Schneckenberger & Bauman
Christopher	Saxon	W. H. Owen
Christopher	Paige	W. H. Owen
Christopher	Premier	W. H. Owen
Columbia	Saxon	E. A. Weinel Hdw. Co.
Columbia	Paige	E. A. Weinel Hdw. Co.
Columbia	Premier	E. A. Weinel Hdw. Co.
Danville	Apperson	Barger Sales Co.
Dixon	Dodge	Angier Wilson
Eldorado	Saxon	C. C. Skelton
Eldorado	Paige	C. C. Skelton
Eldorado	Premier	C. C. Skelton
Fairfield	Paige	H. O. Brockett
Fairfield	Saxon	H. O. Brockett
Freeport	Grant	A. H. Hartman
Fairfield	Premier	H. O. Brockett
Highland	Saxon	F. J. Leutweiler
Highland	Paige	F. J. Leutweiler
Highland	Premier	F. J. Leutweiler
Jacksonville	Paige	L. F. O'Donnell
Litchfield	Saxon	G. T. Lackey
Litchfield	Paige	G. T. Lackey
Litchfield	Premier	G. T. Lackey
Marion	Saxon	Marion Saxon Co.
Marion	Paige	Marion Saxon Co.
Marion	Premier	Marion Saxon Co.
Marshall	Saxon	E. F. Clapp
Marshall	Paige	E. F. Clapp
Marshall	Premier	E. F. Clapp
Minonk	Dodge	Oscar White Motor Co.
Minonk	Overland	Minonk Garage Co.
Mt. Vernon	Saxon	W. A. Underwood
Mt. Vernon	Paige	W. A. Underwood
Mt. Vernon	Premier	W. A. Underwood
Olney	Saxon	Otto Supply Co.
Olney	Paige	Otto Supply Co.
Omaha	Saxon	maha Motor Co.
Omaha	Paige	Omaha Motor Co.
Omaha	Premier	Omaha Motor Co.
Ottawa	Vim	N. A. Fruland
Pana	Paige	B. R. Butts
Pana	Saxon	B. R. Butts
Pana	Premier	B. R. Butts
Robinson	Saxon	Law Hardware Co.
Robinson	Paige	Law Hardware Co.
Robinson	Premier	Law Hardware Co.
Rockport	Saxon	F. S. Gay
Rockport	Paige	F. S. Gay
Rockport	Premier	F. S. Gay
Shelbyville	Saxon	J. W. Wolf
Shelbyville	Paige	J. W. Wolf
Shelbyville	Premier	J. W. Wolf
Streator	Vim	Solon Bros.
West Salem	Saxon	Wm. Harrison & Son
West Salem	Paige	Wm. Harrison & Son
West Salem	Premier	Wm. Harrison & Son
Woodstock	Jackson	J. E. Sherburne

Indiana

Crawfordsville	Oldsmobile	Shaw & Banta
Ft. Wayne	Oldsmobile	Geo. W Souers & Sons
Indianapolis	Marion	Colonial Automobile Co.
Indianapolis	KisselKar	Indianapolis KisselKar Sales Co.
Indianapolis	Imperial	Colonial Automobile Co.

Kansas

Herkimer	Oldsmobile	K. & K. Motor Co.
Topeka	Oldsmobile	H. H. Clark
Topeka	Vim	Rehkopf Bros.
Wichita	Vim	Goodin Motor & Truck Co

Kentucky

Danville	Maxwell	D H. Prewitt
Elizabethtown	Hupmobile	A. H. Miller Implement Co.
Eminence	King	Geo W McDade
Falmouth	Maxwell	J. C. Held
Glasgow	Saxon	Dickinson Bros
Lexington	Oldsmobile	Lexington Cadillac Co.
Louisville	Oakland	Kentucky Automobile Co.
Mt. Vernon	Maxwell	T. C. O'Mara
Salvisa	Maxwell	G. L. Alford

Maine

Augusta	King	P. B. Gibson

Massachusetts

Boston	Apperson	Apperson Motor Co. Boston
Springfield	Vixen	Winchester Motor Co.
Springfield	Maxwell	Bennett Motor Car Co.
Springfield	Moline-Knight	Winchester Motor Co.

Michigan

Belzoni	Apperson	H. H. Alexander
Charlotte	Paterson	Chas. White
Grand Rapids	Republic	E. C. Patton
Grand Rapids	Marion	William Miller
Grand Ledge	Maxwell	Grand Ledge Mach. Co.
Grand Ledge	Studebaker	Grand Ledge Mach. Co.
Greenville	Studebaker	O. C. Kemp & Son
Greenville	Overland	O. C. Kemp & Son
Greenville	Oakland	O. C. Kemp & Son
Jackson	Dort	L. C. Watkins
Lawrence	Ford	Welcher & Kelly
Morenci	Allen	Lou Hill
New Brunswick	Vim	Enterprise Garage
Lake Odessa	Studebaker	Charles Kart
Lake Odessa	Ford	Charles Kart
Ypsilanti	Reo	Joseph H. Thompson

Mississippi

Canton	King	T. C. Holliday
Jackson	Vim	Capital Auto Co.

Minnesota

Browersville	Chevrolet	Peter Droug
Buffalo	Maxwell	L. J. Hoffman
Excelsior	Oldsmobile	A. E. Phillips
Farmington	Oldsmobile	John Wright
Fergus Falls	Apperson	Fergus Auto Co.
Glenn	Vim	B. A. Goff
Luverne	Oakland	Home Automobile Co.
Minneiska	Chevrolet	Tibbesar & Weiser
St. Cloud	Vim	Grundman Auto Co.

Maryland

Cockeysville	Ford	Walter P. Rechord
Denton	Ford	Denton Auto Co.
Easton	Ford	Clark Auto Co.
Ellicott City	Ford	Robert J. Taylor
Federalsburg	Ford	Covey & Williams
Freeland	Ford	J. M. Hoshall
Galena	Ford	Davis Bros.
Glenwood	Ford	W. H. Stimson
Goldsborough	Ford	Robert Jarrell, Jr.
Havre de Grace	Ford	W. M. Saunders
Jessups	Ford	James D. Gill
Norristown	Ford	The Norristown Garage
Preston	Ford	J. J. Garris
Reisterstown	Ford	Gill & Rauser
Rocks	Ford	Ramsay & Co.
Sudlersville	Ford	Hart & Stunt

Missouri

Bloomfield	Paige	R. E. Parker
Bloomfield	Premier	R. E. Parker
Bloomfield	Saxon	R. E. Parker
Carthage	Apperson	E. S. Williams & Son
Flat River	Saxon	Flat River Motor Co.
Flat River	Paige	Flat River Motor Co.
Flat River	Premier	Flat River Motor Co.
Herman	Premier	R. L. Huzol
Herman	Saxon	R. L. Huzol
Herman	Paige	R. L. Huzol
Illmo	Saxon	T. J. Eifert
Illmo	Paige	T. J. Eifert
Illmo	Premier	T. J. Eifert
Ironton	Saxon	J. C. Forshee
Ironton	Paige	J. C. Forshee
Ironton	Premier	J. C. Forshee
Jefferson City	Saxon	T. J. Burkhardt
Jefferson City	Paige	T. J. Burkhardt
Jefferson City	Premier	T. J. Burkhardt
Kennett	Saxon	Louis Auten Wholesale Co.
Kennett	Paige	Louis Auten Wholesale Co.
Kennett	Premier	Louis Auten Wholesale Co.
Lixville	Saxon	B. E. Rhyne
Lixville	Paige	B. E. Rhyne
Lixville	Premier	B. E Rhyne
Morehouse	Paige	D. L. Lacy
Morehouse	Premier	D. L. Lacy
Morehouse	Saxon	D. L. Lacy
Moberly	Saxon	T. J. Williams
Moberly	Premier	T. J. Williams
Moberly	Paige	T. J. Williams
Old Monroe	Premier	G. L. Pollard
Old Monroe	Saxon	G. L. Pollard
Olney	Paige	F. C. Stroker & Son
Olney	Saxon	F. C. Stroker & Son
Olney	Premier	F. C. Stroker & Son
Old Monroe	Paige	G. L. Pollard
Washington	Paige	C. A. Krumsick
Washington	Premier	C. A. Krumsick
Washington	Saxon	C. A. Krumsick

New Jersey

Camden	King	Camden Auto Co.
Cape May Courthouse	Vim	Dix Auto Co.
Mt. Holly	King	Central Garage
Medford	King	J. A. Lamb
Passaic	KisselKar	G. T. Ray
Trenton	Vim	J. I. Peoples

New York

Binghamton	Vim	Binghamton Motor Car Co.
New York	Metz	Robt. Lurie & Co.
Newburgh	Oldsmobile	L. H. Cowley
Oneida	Lexington-Howard	George I. Lloyd
Perry	King	Watkins & McKurth
Yonkers	Vim	F. F. Dean

Nebraska

Auburn	Apperson	Workman & Rozean
Fremont	KisselKar	McCoy Motor Car Co.
Grand Island	Apperson	Independent Garage Co.
Norfolk	Apperson	Edward C. Engle
Oakland	KisselKar	Mr. Ford
Scribner	KisselKar	Ball & Zeman

Ohio

Akron	Saxon	The Loveland Co.
Alliance	Mitchell	The Alliance Motor Car Co.
Alliance	Ford	The Alliance Motor Car Co.
Alliance	Overland	The Alliance Motor Car Co.
Alliance	Federal truck	The Alliance Motor Car Co.
Bucyrus	Apperson	Samuel Hirtz
Canton	Interstate	Parr & Sahm Co.
Cincinnati	Detroit Electric	Charles Behlen Sons Co.
Cincinnati	J. W. Lehman	Heilman Motor Car Co.
Cleveland	Westcott	Folberth Auto Specialty Co.
Cleveland	Westcott	Folberth Auto Specialty Co.
Columbus	Fostoria	Fostoria Light Car Co.
Columbus	King	Curtin-Williams Auto Co.
Columbus	Dort	Curtin-Williams Auto Co.
Columbus	Cole	Curtin-Williams Auto Co.
Columbus	King	Curtin-Williams Auto Co.
Dayton	Apperson	W. T. Strickler
Dayton	Westcott	C. W. Hoffritz Sales Co.
Dayton	Westcott	C. W. Hoffritz Sales Co.
Dayton	Vim	Durable Dayton Truck Co.
Delaware	Overland	E. L. Main
Findlay	Vim	Castle's Garage
Ironton	Oldsmobile	W. Carl Hart
Marion	Hudson	The Auo Inn Garage
Marion	Apperson	A. D. Hill
Marion	Maxwell	W. M. Rhoades
Martins Ferry	Overland	The Wahl Motor Co.
Middleport	Oldsmobile	H. B. Anderson
Millersburg	Oldsmobile	Carlos Calhoun
Newark	Maxwell	Baird & Gallagher
Salem	Westcott	W. H. Knieley & Son
Tiffin	Westcott	Raymond W. Miller
Toledo	Patterson	The Banting Machine Co.
Toledo	Oldsmobile	Bunnell Auto Sales Co.
W. Liberty	Apperson	C. C. Prall
Youngstown	Vim	Vim Truck Sales Co.

Oklahoma

Atlas	Maxwell	Atlas Motor Car Co.
Ardmore	Maxwell	L. C. Slaughter
Bridgeport	Maxwell	Sellers Merc. Co.
Chickasha	Maxwell	Wier & Wagner
Devol	Maxwell	J. L. Crump
Frederick	Maxwell	Wright Garage Co.
Hobart	Maxwell	J. Terry

Pennsylvania

Allentown	Vim	Krause Auto Co.
Ashland	King	J. V. Monaghan
Bally	King	Wm. H. Tagert
Coatesville	Vim	J. J. Higgins
Erie	Oldsmobile	F A Stoeltzing
Hazleton	Vim	Hazleton Motor Truck Service Co.
Lancaster	Franklin	Flory Bros.
New Castle	Apperson	John Kiefer & Wm. Smith
Pittsburgh	KisselKar	Center Ave. Garage
Pittsburgh	Westcott	Westcott Motor Car Sales Co.
Scranton	Vim	Samuel Weinberg
Sellersville	Vim	E. S Jacoby & Son
Union City	King	E. C. Clark & Son
Wilkes-Barre	Apperson	Mac's Garage
York	King	Franklin Finkel
York	Studeba er	York Auto Exchange
York	Maxwell	Penn Auto Co.
York	Dodge	Penn Auto Co.